COAL AGE

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Enthusiasm—The Great Hill Climber

THE above epigram originated with the late Elbert Hubbard, and it is a motto full of meaning for every coal-mining man. Each of us needs some energizing influence in our work. Without enthusiasm all labor is monotonous.

> *ENTHUSIASM is the genius of sincerity. Few successes are won without it. The prudent man may direct a great enterprise, but it is the enthusiast who regenerates it.*

Almost every man situated on the "firing line" can boast of health, experience, energy and grit. Any two of these assets, coupled with enthusiasm, will produce a winner. All four of these qualities operating without enthusiasm can only turn out an "also ran."

We must quit dreaming of what we might have done in other avenues of work. The life job of some people is to bluff and bluster. They would have us believe the fruits of success grew only in their own backyards. Don't be deceived. Such pretense is as widespread as salt in the ocean but as impotent as an electric locomotive without current.

We must be enthusiastic about the work we do. We must first believe that we can complete our job a little better than anyone else and then set out in earnest to prove that fact.

Every man can remember a day when he loafed along in the grasp of routine until about noontime, when he had a "hunch" that he really ought to make a better shift of it. During the afternoon he worked so well that he felt he had made up for the lost morning. How many of us have done a good day's work and then wondered how much a fellow could really accomplish if he would make 25 days in each month count like that one? That's the great trouble with us—we only approach our work with enthusiasm once in every so often.

We must get out into the thick of things and not become content with reports that too often multiply until a man has to stay in his office ten hours a day writing letters to find out what is really going on and what all the reports are about.

When out on the job be as generous with your praise as with your criticism. When your men see that you are enthused over the possibilities of the work they are doing, they'll feel the same way about it. Enthusiasm, like fever, is contagious.

No man should ever think that he can run a mine to suit the official just above him. A company that is progressive is never wholly satisfied. Systematize the small details so you will have time and energy to hammer hard at the big problems.

Don't be a skyrocket today and a roman candle the rest of the week. Enthusiasm is a seven-day, four-season suit. The fellow who wears it may perspire in July, but his coal bins will be full in January.

Mining Methods Employed in the Anthracite fiald--I

By H. M. Crankshaw*

SYNOPSIS—The methods pursued to win Pennsylvania anthracite vary because the conditions under which mining is carried on also vary widely. This article describes the procedure followed in the southern field in working the Mammoth bed.

The conditions under which anthracite is mined vary so greatly that many diversified methods have been attempted to win the coal. This is because the beds of coal range in thickness from 2 to 60 ft. and are found at all degrees of inclination from horizontal to vertical.

As the Mammoth bed is peculiar to the anthracite region, I will first describe some of the typical methods used to work this seam in the southern anthracite field. Fig. 1 is a cross-section of steep-pitching anthracite measures, showing the Mammoth bed where it is 45 ft.

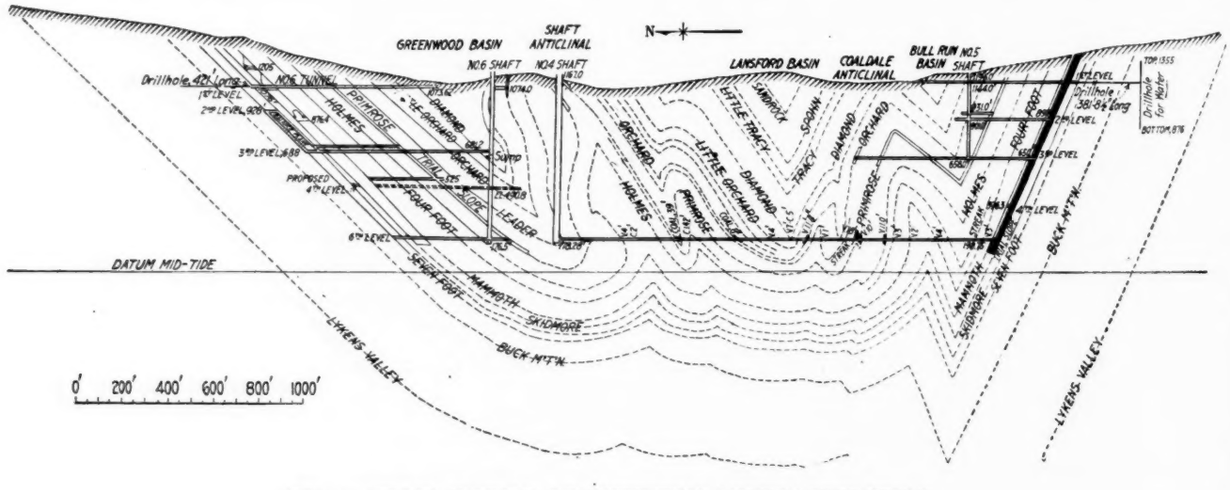

FIG. 1. CROSS-SECTION OF SOUTHERN ANTHRACITE FIELD

thick. As shown on the cross-section there are five levels, on all of which this measure is being worked. On the first level the bed is being reworked for the third time, and only on the fifth is the coal bed really virgin; although at some points on the upper levels there are spots that are being worked for the first time.

In the old breast method all the mining was done from a gangway driven in the Mammoth bed (see Fig. 2), the position of the gangway as a rule being dependent upon the pitch of the measure—that is, when the bed pitched over 60 deg. the gangway was driven along the top rock. Otherwise it was driven along the bottom rock. The local conditions also played an important part in the final location of the gangway.

From the gangway *G* (Fig. 2) a chute was driven up the pitch to connect with the airway or "monkey" *A*, which was driven parallel to the gangway and from 30 to 50 ft. above it. From this monkey, also known as the bottom breast crosscut, the breasts were then started.

In many cases a separate airway or monkey was driven, but often the airway monkey and bottom breast crosscut were combined.

In forming a breast the front manway or "dog hole" *D* and the back manway *B* are driven 20 ft. up the pitch on the bottom rock.

An opening *O* 8 ft. high and 10 ft. wide, forming the bottom of the breast, is made next to the back manway, and this opening is enlarged up the pitch until it connects with the top of the dog hole, in this way forming the stump *S*. The "jugglers," *J*, which are props set skin-tight across the opening at the bottom of the breast, are next put in and after a short manway has been driven on top of the dog hole all is ready for the first cutback. This first cutback simply consists in cutting through the bed from the bottom rock to the top rock. Manways are generally carried when making the first cutback, the distance between the manways being 18 ft., the width of the breast.

After the first cutback is made the breast is driven 30 ft. up the pitch and a second cutback made. Thereafter cutbacks are made every 15 ft. until the breast "runs away."

This system of breast mining has been used extensively on lifts of from 200 to 300 ft. and has not proved satisfactory on account of the low percentage of extraction secured.

It has been necessary to work over the same ground three and four times with the result that timbering and other expenses have been high; therefore, the following improved method was worked out.

Description of Improved Method

In the working of a lift in the Mammoth bed 250 ft. long on a pitch of 65 deg., the bed being 40 ft. thick, the gangway and airway is first of all driven in the underlying Skidmore bed. Instead of starting breasts near the bottom of the lift these are started halfway up the

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lift (see Fig. 3), and are restricted to a length of about 100 ft. The idea of driving breasts only 100 ft. long was derived from the fact that when breasts are started near the bottom of the lift they almost invariably run away after the first 100 ft. has been driven and often earlier, making it practically impossible to systematize the work. In order to drive short breasts slant chutes *A*, *B* and *C* (Fig. 3) are driven in the Skidmore bed, and rock holes *D* put through to the Mammoth 120 ft. apart and halfway up to the lift. The rock holes are then connected by slant chutes *E* along the bottom rock of the Mammoth, from which the breasts are started on 60-ft. centers in the usual way. Each rock hole handles the coal from two breasts, the coal from three rock holes coming together at one loading chute at *X*. The question was often raised as to whether rock work was not too high in first cost. It was therefore desirable to mine coal as soon as possible, so that too much rock work was not done at one time. In this way after the work was once started the cost of the rock work was only about 20 per cent. of the total cost of timbering under the old method. Each set of six breasts has a separate split of fresh air and a ventilating system of its own. The ventilation is arranged very simply on the split system by driving a Skidmore breast (*I* and *J*) from the Skidmore airway far enough up the pitch so that a rock hole *K* put through from the top of the breast will connect with the apex of the slant chutes *E*.

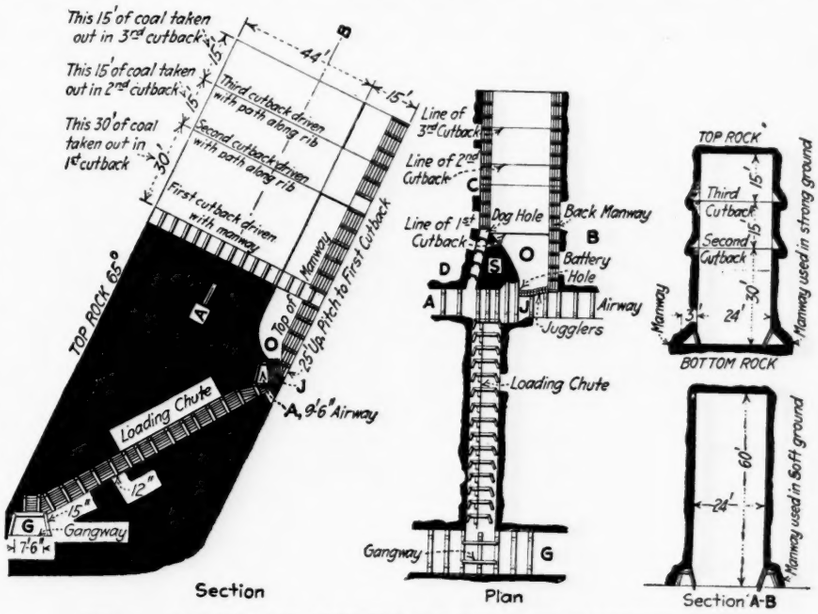


FIG. 2. OLD BREAST METHOD OF WORKING MAMMOTH BED

After the breasts are driven through to the upper level cross-chutes *G* (Fig. 3) are driven across the bed from the apex and bottom of the slant chutes *E* for the purpose of robbing the pillars between the breasts. The breasts are allowed to stand full until cross-chutes *G* are driven through to the upper level, and the breasts are then drawn as the cross-chutes *G* are robbed down, the pillars being completely robbed out by means of the tapping chutes *T*.

In this way *all* the chutes are driven in solid coal, the men are in strong ground all the time, thus being well protected; and a good supply of fresh air is always available to dilute any outburst of gas.

When the upper half of the lift has been robbed back, the lower half is worked in the usual way from the rock holes *M* (Fig. 4) driven direct from the Skidmore gangway. These rock holes are connected by slant chutes *B'* driven along the bottom of the Mammoth bed, and the whole operation repeated as for the upper half of the lift. Working the upper half first, however, has given an opportunity to ventilate the lower half easily as follows: As soon as the first breast *C* is driven up, a short chute *R* is driven from near the top of the breast to connect with the rock holes *H* and the slant chutes *O* in the Skidmore bed, which previously were used as coal chutes but now serve as return airways with no expense for upkeep. The main chutes, wherever possible, should be driven 6x8 ft. so as to give a good sized manway for traveling and for carrying up timber. Also, in order to form a reserve pillar for fire protection or other purposes, a strong pillar should be left every 720 ft., which is the distance between double sections. This method of working was tried first of all on the west side of the fifth level of No. 4 Shaft, Lansford Colliery. The upper half of the lift in the first part of the work is now being robbed down, and the results as to cost and extraction have been excellent.

Where the Mammoth bed is virgin, it often gives off large quantities of gas. Where the bed is being reworked under several hundred feet of cover, as for ex-

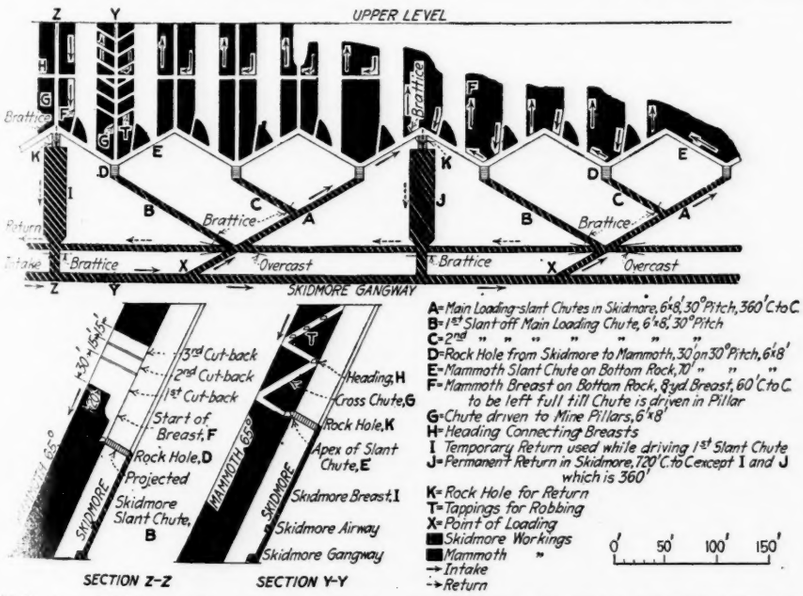

UPPER LEVEL
Brattice
Overcast
SKIDMORE GANGWAY
SECTION Z-Z
SECTION Y-Y
3rd Cut-back
2nd Cut-back
1st Cut-back
Start of Breast, F
Rock Hole, D
Projected Skidmore Slant Chute, B
Heading, H
Cross Chute, G
Rock Hole, K
Apex of Slant Chute, E
Skidmore Breast, I
Skidmore Airway
Skidmore Gangway
MAMMOTH 65°
SKIDMORE
A=Main Loading-slant Chutes in Skidmore, 6'x8', 30° Pitch, 360' C. to C.
B=1st Slant off Main Loading Chute, 6'x8', 30° Pitch
C=2nd " " " " " " "
D=Rock Hole from Skidmore to Mammoth, 30' on 30° Pitch, 6'x8'
E=Mammoth Slant Chute on Bottom Rock, 70' " " "
F=Mammoth Breast on Bottom Rock, 8 yd. Breast, 60' C. to C. to be left full till Chute is driven in Pillar
G=Chute driven to Mine Pillars, 6'x8'
H=Heading Connecting Breasts
I Temporary Return used while driving 1st Slant Chute
J=Permanent Return in Skidmore, 720' C. to C except I and J which is 360'
K=Rock Hole for Return
T=Tappings for Robbing
X=Point of Loading
Skidmore Workings
Mammoth "
Intake
Return
0' 50' 100' 150'

FIG. 3. MINING AND VENTILATING THE UPPER SECTION OF BREASTS IN THICK PITCHING BEDS

ample on the 4th level where the cover is 800 ft. thick, the chutes driven in the bed for re-robbing purposes often get exceedingly hot. Therefore, on the lower levels an ample supply of good air is essential to secure adequate cooling. This can only be obtained by arranging a scheme of ventilation that is so worked out in a split system that the air in no instance is dragged too far or vitiated too much. Where a mine, therefore, extends over several miles, it is necessary to have airways to the surface and possibly fans at or near the extremities of the property.

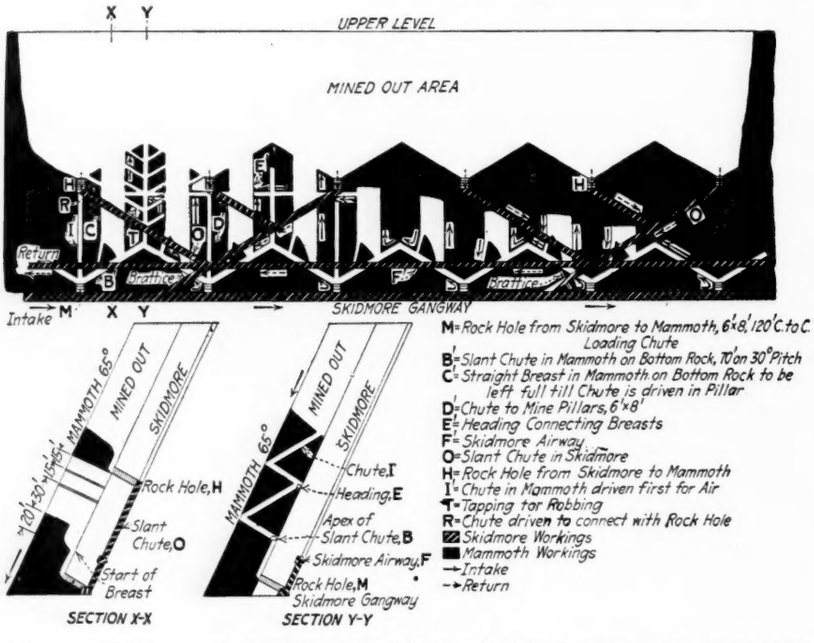


FIG. 4. MINING AND VENTILATING THE LOWER SECTION OF BREASTS IN THICK PITCHING BEDS

One of the chief ideas in the scheme described was to get all the main airways in strong, permanent ground, so that they would not be subjected to squeeze and would entail a minimum expense for upkeep. Two mines producing 700,000 tons per year were working the section where the ventilation was remodeled, and this work took two years to complete. Two electrically driven Sirocco fans were installed having a combined capacity of 250,000 cu.ft. per min. The larger of these machines had a capacity of 150,000 cu.ft. per min., being installed as a blower or forcing fan. The mines were originally ventilated by fans located in the center of the property in the usual way (see Fig. 5), the air traveling along the main haulageways as intake airways and returning along the return airways running parallel to the main haulageways. As the work concentrated at the extremities of the property the following defects became apparent: The air to get to the fans had to travel two miles; the main haulageways were so filled with traffic, as the mines increased in production, that their function as an intake airway was materially impaired; the return airways, where they were located in the Mammoth bed, were exceedingly expensive to keep up, and in the Skidmore they were in many cases too small to carry for long distances the volume of air needed; consequently, the quality of the air in the working places was not satisfactory.

By replacing the central system of ventilation with fans located near the extremities, the length of travel of the air was halved and the sections of the Mammoth airway, which were expensive to maintain, were abandoned. In this way an efficient method of ventilation was secured which made it possible to work coal that had been inaccessible for many years. It is almost astonishing what a cooling effect a good body of fresh air possesses. Chutes in a thick part of the bed that had a temperature of from 100 to 110 deg. F. have been known to cool off to practically normal in a few weeks after a good supply of fresh air was provided. The difference in efficiency per man working under good and bad conditions as to ventilation have probably not been printed, but figures on this subject would be interesting. The diagram (Fig. 5) is self-explanatory. The central fan, by exhaust, ventilates the fifth or lower level, which is known as No. 4 Shaft Level. The Black Rock Slope force fan ventilates the second, third and fourth levels on the east side, and the West Barrier exhaust fan ventilates the second, third and fourth levels on the west side. The central and West Barrier fans are exhaust fans, the Black Rock Slope fan being a force fan.

By making the Black Rock Slope a force fan, it was possible to ventilate the section known as Pancheries' Tunnel, as well as that known as the N. E. Primrose, without the necessity of having long return airways; the haulageways act as intake airways for these sections. When the three fans were in operation the territory was so divided that there were a proportionate number of men to each fan, and the main air current was in each case divided into at least three main splits; each being again split up in the working places as required.

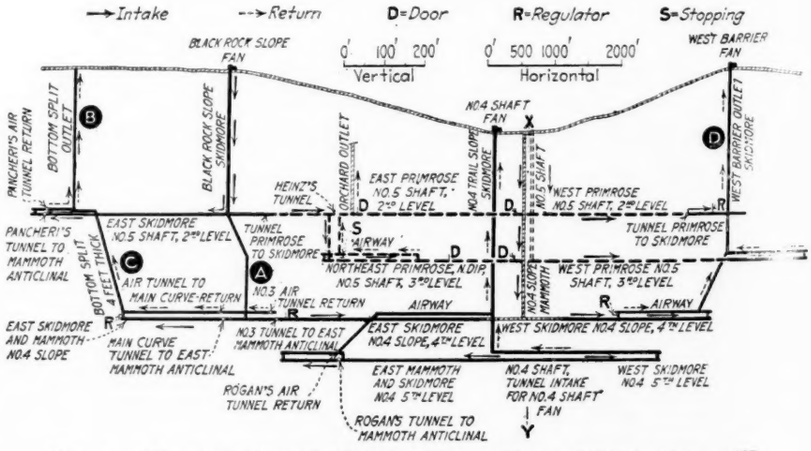


FIG. 5. VENTILATION OF MINES NOS. 4 AND 5, LEHIGH COAL AND NAVIGATION CO., LANSFORD, PENN.

The driving of the airways to complete this system of ventilation was done as follows: In almost every instance

the airways were first of all driven small size, taking advantage of the coal, and then widened from the top down or from the bottom up as the case might be.

In driving the first airways the old system of driving in breast form directly up the pitch was adopted, the breasts being driven 18 and 12 ft. wide respectively, the height being the thickness of the coal, which was about 2 ft.

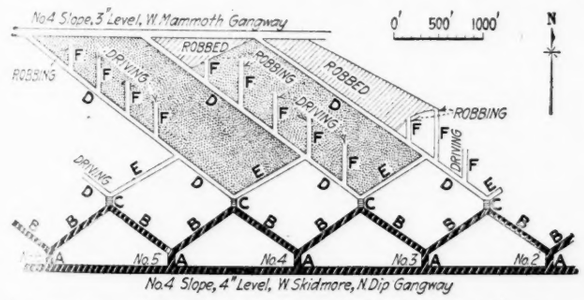
On a pitch of 70 deg., however, after the breasts were up over 300 ft., the difficulties of ventilating the face, carrying up timber and keeping the airways in repair became so overpowering that it was decided to try slant chutes. Once the slant chutes were started their advantages were so apparent that the rest of the work was done in this way at a great saving of time and expense. The driving of these slant chutes was really where the method of using this type of work for mining on an extensive scale originated.

The airway marked *A* (Fig. 5) was the most difficult of all to drive. It was started as a Skidmore breast 18 ft. wide by vein thickness; after a distance of 350 ft. had been driven, all attempts at driving directly up the pitch were abandoned and the airway converted into a 6x6 ft. slant chute on a 40-deg. pitch.

When the slant chute was through to the upper level, it was "skipped" to a finished size of 7x10 ft., the rock work being all done by stoping machines. Then the Skidmore breast was skipped to give a height of 6 ft., which completed the airway.

The airway marked *B* was driven 700 ft. up the pitch as a breast 12 ft. wide and of vein thickness. The vein averaged about 4 ft. in thickness, being the bottom split of the Mammoth, which at this point is very thin.

There were other workings near this airway, so it was possible to get the timber about halfway up to the men by means of slant chutes. The work of enlarging and skipping to full size was then done on contract, starting



A= Straight Chutes on Bottom Rock of Skidmore Bed; Chute 15' on 70°, 6'x8' Chute, 140' C. to C.
B= Straight Chutes on Bottom Rock of Skidmore Bed; Chute 80' on 35°, 6'x8' Chute
C= Rock Chutes from Skidmore to Mammoth Bed; Chutes 30' on 35°, 6'x8' Chute
D= Straight Chutes on Bottom Rock, Mammoth Bed; Chute 300' to 3rd Level on 33°, 7'x7' Chute
E= Straight Chutes on Bottom Rock, Mammoth Bed; Chute 80' on 35°, 7'x7' Chute
F= Straight Chutes on Bottom Rock of Mammoth Bed; Chutes 60' to 100' on 70°, 5'x5' Chute, 35' C. to C.

FIG. 5. METHOD OF REWORKING THE MAMMOTH BED FROM THE SKIDMORE

from the top, down, the finished size being a minimum of 6x12 ft. but running generally 7x12 ft.

The airway marked *C*, which is over 900 ft. long, was driven as a slant chute 7x9 ft. on a 35-deg. pitch, a tramway being carried the whole distance up. In the driving of these slant chutes in the Skidmore vein fast time can be made. The drilling is done by stoping drills worked by compressed air; 6 to 8 ft. are taken out by each cut and when three shifts were at work the contractors have driven as much as 300 ft. in two weeks.

Wherever machines were used the working face was ventilated by compressed air; but in the driving of the

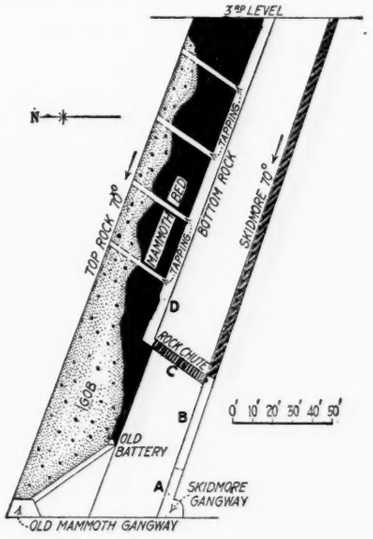


FIG. 7. SECTION THROUGH CHUTE NO. 4 OF FIG. 6

airway *D*, which was started in breast form from the second level 12x7 ft. in size and driven by hand, an electrically operated Sirocco fan 3 ft. in diameter was installed, one manway being the upcast and the other the return.

It was not possible to use machines at this point without going to the expense of putting in 3,000 ft. of compressed air line, which would not have been needed afterward. The other airways were driven as slant chutes with little difficulty; and when the work was completed, the territory was so divided between the three fans that efficient ventilation was secured at all points.

The facility with which slant chutes could be driven in the Skidmore bed had been so thoroughly demonstrated when driving the ventilation outlets, that slant chutes were driven in this measure for the purpose of robbing the Mammoth bed. The slant-chute system shown in Fig. 6 proved to be one of the best. The legend and drawing are self-explanatory when viewed in conjunction with the cross-section, Fig. 7.

From Fig. 7 it will clearly be seen that all the work below the rock chute *C* is in the Skidmore bed and all that above the rock chute *C* is in the Mammoth bed. By driving part of the way up the pitch with a slant chute in the Skidmore bed, the difficult and costly work of getting up the pitch for the first 100 ft. is materially reduced, as the ground, which is likely to contain large rocks and be the hardest to cross, will be near the old battery.

Accidents to Minor Employees—Under the West Virginia statute that gives a right of action for negligently causing death, in favor of deceased's next of kin, and under another statute that makes a father the next of kin of a deceased child, a father who has abandoned a child forfeits right to compensation for his death in employment in which the mother was compelled to place the child. And the mother, not being legally next of kin under the statutes mentioned, is not entitled to have suit maintained for her benefit. Superior intelligence, precociousness and experience on the part of a boy employed in violation of a statute limiting the age of employees does not bar right to recover for injury to him, but proof thereof may be made on question being raised as to whether he was guilty of contributory negligence. (West Virginia Supreme Court of Appeals, Swope vs. Keystone Coal and Coke Co., 89 Southeastern Reporter, 284.)

Anthracite Labor Shortage

By Special Anthracite Correspondent

SYNOPSIS—Companies are working in the anthracite region about 20 per cent. short of the usual quota of men. The men they have strike frequently in violation of their agreement and are much disposed to quit work for circuses, funerals, picnics and church festivals.

Lack of labor and the indifference of mine employees point to a decided shortage of anthracite coal this fall and winter. A tour of a portion of the hard-coal fields reveals a shortage of about 20 per cent. of miners and laborers based on the number of men employed in the mines last year. Notwithstanding this condition there is an apparent indifference existing among those now at work and they frequently remain away from the mines, thereby adding to the prospect of a coal shortage.

Inquiry shows that the greatest shortage of labor is with the miners and their laborers, the real producers of coal. There is also a decided shortage among the other classes of help but it is not so pronounced. The head of one large company estimates his loss at 400 miners and 700 laborers. This same company had on its books in July of this year nearly 2,500 less employees than it had in the corresponding month of last year, or about a 17-per cent. shortage.

Another of the large operating companies is working with about 25 per cent. fewer men and boys than a year ago. Still another company with operations in Lackawanna and Luzerne counties is short about 10 per cent. of its normal number of workers, about 60 per cent. of this shortage being found among the miners and laborers.

A fourth company with nearly a score of operations complains of a shortage of 28 per cent. out of a total of about 15,000 men and boys. A fifth company, with many operations, has less workers than a year ago by 17 per cent.

Causes Are Many for the Shortage of Men

The same average practically applies to all the companies and individual operators throughout the coal fields, and the prospects of replenishing the working forces in the immediate future are dim. At the present time the fear is expressed that the mine forces will grow smaller and will remain short until the end of the European conflict, when those who have gone into other industries or have returned to their native lands to participate in the war will probably return to the coal fields.

The number of coal-mine employees has been decreasing for many months, in fact since the beginning of the war in Europe. The majority of those leaving the coal fields have found employment in munition plants, with higher wages and pleasanter work. Others have taken their usual summer journey to the farms and will soon retrace their steps. This movement has already started but the number of mine-farmers is small in comparison with the total number of mine workers. Some of those who responded to the call of the munition plants have already found their way back to the mines and others are expected to return to their old occupation shortly.

Then, again, the call of the Federal Government to the National Guard has taken many members of that organization away. Still others have gone west. These are not likely to return. Most of those going to other sections of the country are 30 yr. of age, or younger, and without family ties to detain them in the coal fields. In many instances their parents soon followed them to their new-found homes and employments.

Another important factor in the lack of coal supply is the number of button strikes that have occurred in the coal fields since May 5 of this year, when the new working agreement between the mine employees and the operators was signed. This agreement continues the award of the Anthracite Coal Strike Commission which provides for no discrimination against the nonunion mine employee, but this provision has to a considerable extent been nullified.

The miners' union requires that every member of the organization in good standing shall wear a button indicating that his dues have been paid and if any employee fails to wear this emblem, or has none to wear, the union men refuse to work with him, thereby throwing the mine idle. Such a condition existed in the Shamokin coal district for 11 days last month with the result that more than 17,000 mine employees were idle because about 400 fellow workers refused to join the organization. This strike naturally reduced the output of anthracite markedly.

The Few Men Who Are Left Work Irregularly

From June 8 to Aug. 4, 19 collieries in various sections of the coal fields were idle because of these so-called button strikes, and in one instance the suspension of operations was particularly vexing, being due to the refusal of only 8 men to join the union. This number of strikes does not, however, show the complete efforts of the union men to interfere with the production of coal. There were a number of other strikes, some of which were settled quickly or only after a delay of some days. It has been estimated that nearly a quarter of a million of dollars has been lost in wages to the mine workers as the result of these labor difficulties.

The refusal of one company to pay its men during working hours, after the signing of the new working agreement, has been another cause of suspension of work. Previous to May last this company as an accommodation to its employees and to enable them to get home as soon after the end of their day's work as possible, sent its paymaster to the mine to pay the outside men during the noon hour and the inside workers when they arrived on the surface. With the inauguration of the 8-hr. day this system was abolished and the paymaster went to the mine ready to pay at the end of the 8-hr. period. This was not satisfactory to the men and the result has been that the workers often remain away from the mine on payday, and in some instances the day following.

One company official gave the causes of idleness at the mines as follows: Circuses, funerals, picnics, payday and button strikes. Every mine manager can duplicate this same list. The advantage of the 8-hr. day granted by the mine owners has not yet become apparent although John P.

White, head of the miners' organization, asserted during the wage conferences in New York, and later, that the miners would produce as much coal under the new system as under the old. So far, coal managers assert, the shorter day has proved to be a disadvantage.

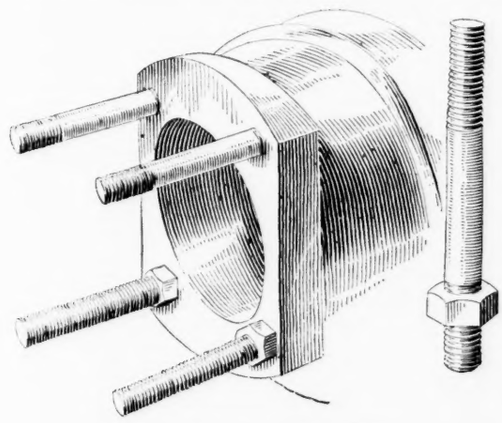
An instance of interference with production occurred on Aug. 15, the Feast of the Assumption. One company with more than a score of operations had three collieries working. Two of these worked 4½ hr., and one 2½ hr. The following day two of these three collieries were idle, and the other was about half manned.

Another colliery manager, speaking of the lack of coöperation and of the indifference of the men to the terms of their agreement to work every day except Sundays and legal holidays, said that from June 1 to the latter part of August not a day passed but one or more of the score of operations which he supervises has been idle for some cause or other.

The companies are putting forth every effort to get out coal and want their mines to work 8 hr. daily and six days a week, but are often forced to shut down, owing to the indifference shown by the men. Because of the heavy demand last winter and spring and the failure of the mines to produce more coal, the companies withdrew coal from the storage piles to such an extent that there is comparatively little in store at the present time. It is for this reason that the anthracite operators are urging the public to put in their winter supply of fuel at the present time and before the winter with its storms interferes with transportation facilities.

Locknut on Gland Stud

A boiler-feed pump with 5⅞-in. plungers caused a lot of bother by the gland studs breaking off where they screw into the pump body, says Stanley Smith in *Power*. I have found a way to overcome this trouble by threading the whole length of the stud and screwing a locknut up against the pump to act as a support and to keep the stud solidly in place. It is a great improvement over the original design. For long studs or such as cannot be threaded their entire length, the thread may be cut enough longer than the threaded hole to receive the nut also, in which case the nut is backed on first, then the stud is screwed into the casting snugly and finally the nut is tightened as before. A long stud such as described is shown to the right of the illustration.



APPLICATION OF LOCKNUT

Recollections of a Manager

The chairman of our board of directors, Mr. Slayton, is a very approachable man who easily enters into the feelings of others and consequently is often imposed upon by cranks and impostors. His close friends twit him and sometimes go so far as to suggest that he is "easy". "Perhaps I am," is his usual reply, "but fools and cranks are full of ideas and I am always open for suggestions. Moreover it is impossible to determine whether some men with strikingly original ideas are needle-witted or madmen."

Once he adjourned a business meeting of the board of directors at which I happened to be present for half an hour, to give an ex-professor of political economy a chance to address them. The professor in question had been dismissed from a college chair only a short time before because of his radical views, and many of his closest friends considered him unbalanced. After the ex-professor had finished his talk and departed, our chairman asked all present for an opinion of the man; exactly one-half of them promptly classed him as crazy while the other half insisted that he was brilliant. Since the directors were evenly divided in their opinions, Mr. Slayton turned to me (I noticed a twinkle in his eyes) and asked me to cast the deciding vote; I had to tell them that I could not make up my mind whether to class him as a genius or a lunatic, and I meant precisely what I said.

As he began his talk the professor seemed ill at ease and most of the directors appeared to be listening with only one ear; but gradually he warmed to his subject and finally became so absorbed in what he was saying that he seemed to forget that he was talking to an audience at all. About that time I chanced to look at Mr. Slayton and I saw that his eyes were fairly sparkling.

Some of the professor's remarks were rather personal considering the makeup of his audience. For example, he remarked that labor as a rule has little basis for complaint against capital but almost invariably does have reason for complaint against the agents of capital. He stated that in all of his investigating he rarely found instances of capital earning more that a fair rate of interest on the money invested, yet in those same industries directors and officials could be found on every hand who were receiving compensation out of all proportion to the service they could render. This excessive compensation was not always in the form of salaries, but often took the form of stock certificates and even bonds, obtained by capitalizing inside information; generally with the assistance of Wall Street. He had never carried on any investigation in the coal industry, but felt sure that the conditions were not far different from those existing in other industries, such as the railroad industry for example. If we would recall the facts brought out in some of the recent railroad investigations he felt sure that we would understand just what he was driving at.

It is a fight similar in all respects to that being constantly waged between the farmer and the consumer of his produce. The consumer thinks he is being robbed while the farmer demands and is sure that he should receive higher prices. Both are partly right but they will never improve matters until they turn their attention on the unfair exactions of the middleman.

The Season of Explosions

By J. W. Powell*

SYNOPSIS—The winter is the time above all others when mine explosions are most likely to occur, since in winter the mines are the driest. Care, eternal vigilance and the observance of certain precautionary measures may do much to forestall disaster.

The winter is the period of the year when we are likely to frequently hear of mine explosions. Hence it behooves every mine official and every employee to keep his eyes open to the vast and varied possibilities of accidents which are liable to occur at this period perhaps more than at any other time. Let each of us engaged in an official capacity determine that there shall be no such accident at the mine at which we are employed, if it is possible to prevent such an occurrence by close observation and the enforcing and practicing of all precautionary measures. The statement is often made that accidents will and have occurred in mines where the records show that every precautionary measure has been taken and where the mine has been conceded to be well regulated and under the best possible supervision; that the mine has been operated for years without the occurrence of an explosion, and yet under the same management and careful supervision it has become the scene of a catastrophe. All candid persons will admit that this is often the case.

However, we should neither take any consolation from these facts nor consider that if our mine is kept in good shape we are doing all we can, and if an explosion occurs it is only history repeating itself. If we carefully investigate the causes of coal-mine explosions, we will almost invariably find that their origin can be attributed either to some blunder, to an oversight of the management, or to problems presented by new conditions that have not been solved in detail.

The only means, therefore, of reducing these disasters is to keep continually thinking about the mining systems employed and the varied conditions that must be met.

Some Suggested Precautions

I would suggest to all mining officials and employees the importance of complying with rules for the reduction and prevention of accident from explosions. While the cautions enumerated may be no innovation, yet a renewal of their contemplation and a careful consideration of them one by one will no doubt be of great benefit and, may possibly be the means of preventing a catastrophe. It is with this idea alone in mind that I submit the following for careful study:

1. Consider well the causes from which an explosion may occur and eliminate them. Exudations of gas cannot be prevented, but safety lamps may be used if necessary and ventilation may be made thorough. The great principle of safety in this respect, and one which applies everywhere and to all mines, is to secure abundant ventilation, which should be conducted through the workings and caused to sweep the face, thus diluting and rendering harmless all the noxious or explosive gases emitted by the coal seam.

2. Establish a system of ventilation in which doors are eliminated as far as possible on haulage roads.

3. Carry and keep up the brattices in working places, thus preventing any accumulation of gas.

4. Prohibit absolutely the pernicious practice of brushing out gas with a coat or a piece of canvas. Gas should be removed only by the application of a current of air of sufficient quantity and velocity to clear out such accumulations and keep them out.

5. Prevent as far as possible the blocking or choking of any air passage under any circumstances.

6. Consider well the possibility of gas exuding from any strata in the roof or floor or from the shales in contiguity therewith.

Firebosses and officials generally should be particularly careful in this respect in pillar work where roof falls are occurring. The top of such falls should be examined carefully as far up as possible for any accumulation of gas, as in the event of there being any gas stratified above the fall and above the level of the roof of the seam, it may be displaced by a subsequent fall and brought down upon the lights of the men.

To reduce the liability of accumulations over falls or in abandoned workings or void places in the mines, all timbers should be pulled as soon as the place is finished or drawn back far enough and every effort made to cave the roof and close the opening. The drawing of timber systematically will cause the roof to fall without bringing on a general squeeze lasting for days or perhaps weeks. In gaseous mines we seldom realize the possible dangers encountered through large volumes of gas being given off into the working places during this period.

It is also advisable, in case of accumulations of gas over falls of roof or in abandoned workings where it cannot be cleared out by a system of ventilation and carried directly into the main return air current of the mine, that drill holes should be sunk from the surface of sufficient size to tap such accumulations, drawing them to the surface and out of the mine. Such drill holes should be sunk at the most practical and efficient points determined from the survey of the mine.

7. If safety lamps are necessary, employ only those of the most approved type.

8. In all cases where dislocations of the strata, creep, upheaval, working of the roof, thrust or similar disturbances are encountered, use safety lamps only and be ever on the alert.

9. In all cases of cutting into coal from below, as in driving up from a lower to a higher bed or in driving a drift to cut the coal that has been thrown down or up by dislocations, one may be quite sure that danger of gas exists, and in all cases of following the hade of faults to find the seam or to prove the amount of throw, use safety lamps, as gas is almost sure to be encountered. If not occluded in the coal seam, it may exude from the accompanying shales above or below it. When coal beds known to be gaseous are being approached from any direction, even in sinking a shaft, it should not be

*Victor-American Fuel Co., Delagua, Colo.

assumed that conditions are safe, because the gas may escape up the shaft. Serious accidents have been known to follow from the bursting of the floor or the escape of gas through crevices or gullets in the strata under these circumstances.

The Danger of Coal Dust

10. The danger from the influence of coal dust in causing or propagating explosions is well known. Seasonal changes have a marked effect upon the coal-dust factor. During the summer the air in the mines is cooler on an average than that outside. As a consequence, when the warm air is drawn into the mine, saturated or nearly saturated with water, and then cooled, a certain amount of this moisture is condensed and serves to keep the mine damp.

With the approach of cold weather the conditions are reversed. The outdoor temperature becomes lower than that in the mines. The result is that whether the cold air going into the mine is saturated with moisture or not, as soon as its temperature rises, its capacity to absorb water becomes increased and it begins to dry out the mine.

If the air is only partly saturated when it enters the mine, its drying effect will be greater. Inasmuch as the large volume of air that is necessary keeps the dust in a dry condition during the winter, especially, it behooves us to use every means possible to reduce the production of dust and prevent its accumulation. Some dust will accumulate in the best-managed mines, and means by which it may be rendered inert and harmless should be introduced if possible.

In order to secure this protection, all dust as far as possible should be cleaned up and sent to the outside of the mine. This is really the only safe place for it.

11. A system of mining should be installed that will have for its object the reduction of the formation of fine coal. Shooting from the solid should not be tolerated, since this is a prolific cause of the production of large quantities of coal dust.

Machine- or bug-dust should be loaded and sent out of the mine immediately and not allowed to accumulate under any circumstances.

12. All cars when loaded should be thoroughly wetted down, the water being applied over the top of the car and to all cracks and around the end gates. This wetting down may be accomplished by a hose attached to the water line on all switches adjacent to the working places. This would prevent to a great extent the fine coal being scattered along the entries, which is the source of possibly 90 per cent. of the coal dust distributed along the main haulageways.

13. Cars should be strongly constructed and the end gates made to fit tightly or if possible entirely omitted, since there is a large leakage of fine coal from this source alone.

14. When cars are topped to a height of 18 or 20 in., as is the custom in some mines, it should be seen that such toppings are built substantially, for in the journey to the tipple a large amount of coal may be thrown along the haulage roads, through the jerking and bumping of the cars in transit.

15. Humidifying systems, where installed, should be watched closely to see that they are of sufficient capacity to thoroughly do the work for which they are intended. If this is not practicable, they should be assisted by spraying or watering systems so as to keep the roof sides and floor of the mine in a moist condition. This work must be done thoroughly, as any system of watering or sprinkling that only occasionally moistens and allows the dry dust to accumulate on the timbers, roof and walls of the roadways is useless, and is also dangerous, in that it may generate an unwarranted feeling of security against explosion.

16. Where the system of utilizing the inert properties of shale or adobe dust by scattering it in every nook and corner of the haulage roads, placing it on shelves suspended at regular intervals throughout the mine, is employed it should be watched closely and such shale dust should be renewed frequently so that it will not become mixed with a dangerous percentage of coal dust. Where adobe or shale dust is used, a liberal watering of the floor in addition is also necessary, as fine coal is continually being pulverized to dust by the transit of cars and the traveling of men and animals. The system employed by the Victor-American Fuel Co., at Delagua, Colo., and which was described by Samuel Dean in the Nov. 30, 1912, issue of *Coal Age*, combining the application of adobe dust and the wetting down of the floors by a watering system, is to my mind safe, practicable and efficient.

Dangers from Blasting

17. One of the important causes of explosions of gas and dust is the misuse of explosives. Indeed, this has been the origin of some of our greatest disasters and to it can be attributed a large percentage of all explosions. Hence it behooves us to take every precaution possible in the use of explosives. In all coal mines permissible powder should be used for blasting purposes, and especially in those which are gaseous and dusty. The flame from the explosion of black powder lasts from 2,500 to 3,500 times as long as does the flame from permissible explosives and is therefore more likely to ignite inflammable gas or dust.

18. The entire handling of these explosives should be intrusted to shotfirers who have been carefully selected. These should be men of known discretion and possess experience in the use of explosives.

19. Only shots that are properly prepared and undercut to a point at least 6 in. beyond the end of the drill hole should be fired. Before charging any hole, it should be ascertained that it is well balanced; that is, that the heel and toe of the shot to be fired also its depth are proportionate to each other. Windy shots are sometimes caused by the shot being improperly balanced even when the undercutting was properly done.

20. All places should be examined thoroughly for gas or dangerous accumulations of dust before firing any shots. All holes should be properly cleaned of loose coal to their bottoms and tamped to the mouth with clay, adobe dust or other incombustible material.

21. Never light two or more shots in the same working place at one time, as the gases and dust generated by one shot and held in suspension in the air may be ignited by the flame of the succeeding shot and an explosion of perhaps disastrous proportions be thus precipitated.

22. No holes should be drilled near the remaining portion of a former shot or near cracks or fissures made by previous blasts, because there is under such circum-

stances great danger of the powder gases on explosion escaping through the loose coal or cracks and igniting gas or dust in the mine air. Each place should be examined thoroughly after shooting to see that there is no fire or gas feeders burning in the loose coal. Dependent shots should be prohibited by law in all states, as is the case in Colorado. All blasting in gaseous mines should be done by electricity.

In conclusion I wish to state that if all mine officials, superintendents, mine foremen, firebosses, shotlighters and safety inspectors will realize the weight of responsibility that rests upon them, and that through their forethought and the conscientious discharge of their duties they become important factors in the prevention of accidents, much good will result.

An Easily Made Planimeter

Some time ago it became necessary to figure out the volume of the combustion chamber of a gas engine very accurately. There are a number of ways of doing this, but the quickest and most satisfactory method is to use a planimeter. I was in a hurry for the instrument, but finding that it would take a month to get one, decided to have one made in the toolroom. It was made as shown in 1½ days and was found to be as accurate as one costing about $50, with which it was checked some time later.

The principle on which such a planimeter works is shown in Fig. 1, and it is operated as follows: Place the

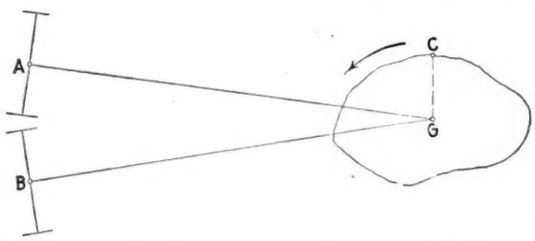


FIG. 1. METHOD OF USING A PLANIMETER

instrument on the drawing with the tracing needle to the right and as close as possible to the center of gravity of the figure to be measured. In this position say the truck is at *A* and the needle in the truck is pressed to prick the paper at *A* and the needle in the tracer at *G*, the center of the area to be measured. Now move the pointer up and prick the periphery of the figure at *C*, being the point first reached. In tracing, follow the outline in a counter-clockwise direction, as shown by the arrow, and when *C* is again reached, stop and return the pointer to *G*. Depress the needle so as to fix the position of the instrument accurately in the position from which it started, then depress the needle in the truck. This will be marked at *B*. Measure from *A* or *B* to *G* and from *A* to *B* in hundredths of an inch and multiply together. The product will be the area of the figure in square inches.

The distances should be measured each time, because any variation in the setting of the tracing point will affect the reading. If the area is small, the distance *AG* should be reduced so as to increase *AB* and thus make the reading more accurate. With a little practice in the use of this instrument very accurate results are obtained. Its construction is simple and inexpensive. The illustrations, Figs. 2 and 3, show how it is constructed, and the most important points to observe are the following:

1. The small bevel wheels of the truck should be mounted together on a mandrel and turned to exactly the

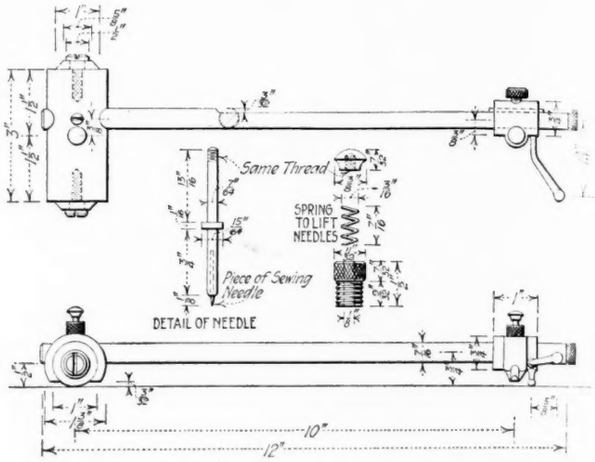


FIG. 2. DETAILS OF CONSTRUCTION

same diameter; otherwise the instrument will not be accurate.

2. The beam and the axis of the wheels must be exactly at right angles to insure accurate readings.

3. The adjustable carrier for the tracing needle must be kept from turning; otherwise the tracing needle and that in the truck will not be in a plane which forms a right angle with the axis of the wheels. In this construction a flat is provided on one side of the beam and a small half-round piece inserted in the adjustable needle carrier.

4. The needles are held just above the level of the paper so as not to catch. The tracing needle is exposed so that it can easily be seen from all sides as it traces a figure. A small foot keeps the needle from touching, and a handle is provided to guide the instrument while tracing.

5. The small wheels must have narrow edges, about $^1/_{64}$ in. wide and be equidistant from the center line joining the two needles.

Any good toolmaker ought to be able to make this instrument in two days, and in almost any shop the

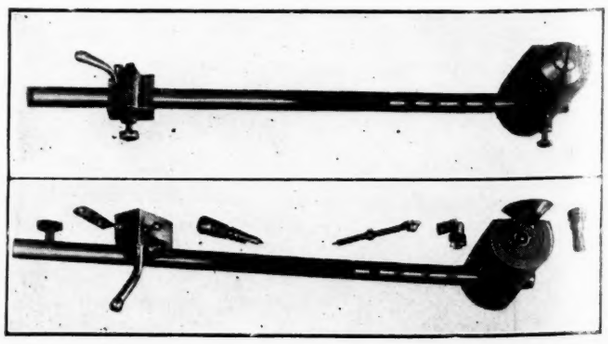


FIG. 3. PLANIMETER COMPLETED AND ASSEMBLED

material should cost practically nothing because scrap can be used. The truck was made from 1½ in. round stock 3 in. long and the beam from a piece of ½-in. steel 12 in. long.—Chester S. Ricker in *Power*.

Coal Mining Examinations

By Alexander Waugh*

SYNOPSIS—Examination of mine foremen, assistant mine foremen and firebosses, on a practical scale, in the Bruceton Experimental Mine. Outline of the tests given and a tabulation of the results obtained in the examination of candidates.

During the last two years the examining board for mine foremen, assistant mine foremen and firebosses of the Seventeenth Bituminous District has made the practice of holding its oral examinations at Bruceton, Penn., where is located the Experimental Mine of the Federal Bureau of Mines.

The engineers of the Bureau have coöperated very kindly with the examining board in its efforts to make the examination of candidates as practical as possible, by extending to the board the privilege of having the candidates enter and examine the Bruceton mine, in every detail, in the same manner that they would be called upon to examine a mine in their charge when appointed to an official position. In this manner, it was believed that the candidates could give more satisfactory evidence of their ability to perform the duties required in their several offices, as they would be more at home when working under the actual conditions that they were called upon to describe and explain.

With the assistance of E. H. Denny, the Bureau engineer in charge of the mine, practical tests were prepared, such that the candidate would have to contend with daily in his regular work in the mine and with which he would be expected to deal promptly and intelligently. These tests served the double purpose of demonstrating a candidate's practical ability, while at the same time impressing on him the importance of cultivating the habit of close observation when examining a mine.

Inasmuch as frequent requests have been received by the board, asking for an outline of the examination and explanation of the character of the tests submitted to candidates, Van H. Manning, Director of the Bureau, has granted the board permission to give the following description of what took place at the last examination, held May 19, 1916, at the Bruceton mine. The director of the Bureau of Mines and the members of the examining board believe that the publication, in *Coal Age*, of the tests given in that examination and the results obtained, will prove valuable to prospective candidates and mine officials alike.

Following is the report of the examination prepared and furnished by E. H. Denny, mining engineer in charge:

Examination of Firebosses, Assistant Mine Foremen and Mine Foremen at Bruceton Mine

On May 19, 1916, thirty-nine candidates for certificates for the positions of fireboss, assistant mine foreman and mine foreman were given a practical examination at the Experimental Mine of the Bureau of Mines, at Bruceton, Penn. This examination was conducted by the examining board of the Seventeenth Bituminous District of Pennsylvania, consisting of J. I. Pratt, district mine inspector, James Porter, superintendent of Lick Run mine and Alexander Waugh, miner. The examination consisted in each candidate making an inspection of the mine just as though it were an operating mine, and reporting to the board conditions he found, together with his recommendations in regard to any changes that, in his opinion, were needed.

About twenty subjects were prepared in the mine on which candidates were expected to report. Some of these were peculiar to the Experimental Mine, owing to the requirements of making explosion tests therein. For instance, there are no shelter holes in this mine and there is also but little clearance along the track. A canvas curtain is used in the aircourse between the butts, in the place of a door, and there are wood shelves spanning the entry, from 5½ to 6 ft. above the floor. Besides these, there are numerous side projections in the entries, such as shelving and bolts.

A summary of the results of the examination is shown in the attached tabulation; the numbers given in the first column for each class of candidates represent the number of men who reported each subject.

	Firebosses		Assistant Foremen		Foremen	
	Total Number of Candidates					
	20		14		5	
Subject for Report	No.	Per Cent.	No.	Per Cent.	No.	Per Cent.
Coal-dust deposits: General note	1	5	8	57	2	40
Specific places	2	10	..	..	..	..
No report	17	85	6	43	3	60
Rock dust	..	..	2	14	1	20
Obstructions of timber or dirt piles along road	12	60	9	64	3	60
Cars obstructing the air	8	40	9	64	4	80
Doors needed between Nos. 1 and 2 butts	2	10	6	43	3	60
Stoppings needed at second breakthrough between Nos. 1 and 2 butts	6	30	11	79	4	80
Canvas needed. Breakthroughs in rooms	9	45	11	79	5	100
Lack of track clearance in aircourse and in rooms 1, 2, 3 and 4	7	35	9	64	4	80
Gas:*						
—650 ft. inby (0 to 2 per cent.)	8	40	13	93	5	100
Per cent. estimated	..	..	1	7	2	40
—1,500 ft. inby (1 to 2 per cent.)	8	40	10	71	3	60
Per cent. estimated	..	..	1	7	1	20
—Room 3	16	80	4	28	2	40
Per cent. (explosive?)	..	..	..	..	..	..
Man with unlocked lamp, No. 2 room	..	..	3	21	..	..
Slate improperly posted, No. 2 room	10	50	12	86	2	40
Unprotected trolley wire across necks of Nos. 3 and 4 rooms	9	45	10	71	4	80
Cable across No. 4 roomneck, hanging from hooks in roof	2	10	9	64	2	40
No. 5 room	13	65	13	93	5	100
Man drilling out missed shot	6	30	9	64	3	60
Coal-dust tamping	5	25	6	43	3	60
Unprotected black powder, coalite and caps	8	40	9	64	5	100
Lack of shelter holes	3	15	7	50	5	100
Lack of supplies	3	15	6	43	5	100

*Several said slight amounts or trace.

A number of undesirable or unsafe and unusual practices had been previously prepared to test the knowledge and habits of observation of the candidate. For example, there was dry coal dust on a portion of the main entry and incombustible (rock) dust on a portion of the aircourse. The ventilation in the main entry was obstructed by a trip of loaded cars. A man was working in No. 2 room, near an improperly posted and unsafe piece of drawslate. His safety lamp was unlocked. In No. 5 room, a man was drilling out a

*Secretary, examining board, Seventeenth Bituminous District, Hackett, Penn.

missed hole, which had been loaded with black powder and stemmed with coal dust. Near him was a small bag of black powder, four loose sticks of permissible powder and some blasting caps.

There were gas accumulations in three places. At the face of the main entry, 1,300 ft. inby from the mouth of the mine, there was between 1 and 2 per cent. of methane. In No. 3 room, which was about 80 ft. from the butt entry, there was an explosive mixture of gas in a hole in the roof. In a closed crosscut on the air-course, 650 ft. from the entrance, there was a variable quantity of gas escaping from a pipe near the roof. At times it was more easily detected by the odor of natural gas, or by a slight sound caused by its escape from the pipe, than by any cap indication with the safety lamp. All of these accumulations were formed from natural gas and hence were open to the objection that they were perceptible, at times, to the sense of smell. There was an unprotected trolley wire on one side of room, No. 1 butt, extending across Nos. 3 and 4 roomnecks.

The fan-engine speed was kept at 20 r.p.m. and the fan speed at 42 r.p.m.

Seven of the twenty firebosses found nothing wrong in No. 5 room where a man was engaged in drilling out a missed hole, which had been stemmed with coal dust. A cloth sack containing black powder, some loose permissible powder and electric detonators were lying near. Two of the remaining firebosses expressed the idea that the miner ought not to drill out a missed hole with so much powder lying around loose, seeming to imply that there was nothing the matter with the drilling out of the shot itself.

Few of either the foremen or the firebosses were successful in finding gas in all of the three places presented. Those who had found it in the crosscut at 650 ft. inby must have been guided in some cases by the sense of smell, as the amount of gas there was variable and not easily detected with a safety lamp. Almost all of the firebosses found gas in a hole in the roof, back from the face of Room 3 but the foremen were not so successful in finding this pocket of gas, leading one to suspect that the firebosses were "tipped off" in some way as to the existence of the gas. In general, it may be said that the candidates for fireboss, as might be expected, did not possess nearly the observing power of the foremen, in detecting the presence of gas, and noting roof conditions, dust, obstructions, needed canvas, improper mining methods, etc., in most of which the foremen greatly excelled. Almost all candidates commented upon the dusty condition of the mine; but apparently, in most cases, their comments were based on observations of the quantities of dry shale dust scattered throughout the mine and not upon the dangerous coal dust scattered just outby from station 450 on the main entry.

Although the fan engine was kept running at a constant speed and the ventilation was nearly constant in velocity (about 6,000 ft. per min.), widely divergent results were got by anemometer readings, the same two anemometers being used by all the candidates. The return-air readings differed widely in quantity from the intake measurements, being sometimes several thousand feet more and sometimes less than those on the intake. The stoppings in the mine are of concrete and there is no leakage of air. The variable results were doubtless due to the improper holding, reading and general manipulation of the instrument and failure to make corrections.

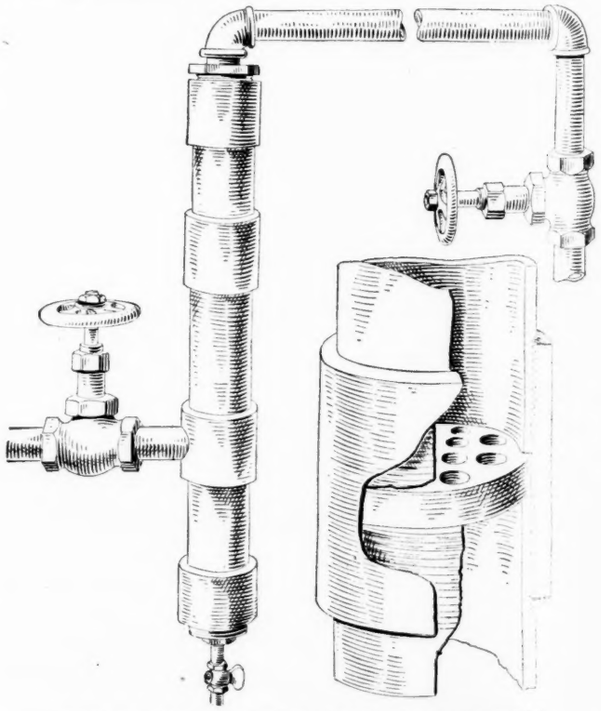
Gas observations were general and did not usually give percentage of gas or height of cap observed, although the words "small," "slight" and "trace" were used in some cases. Much time was taken by candidates in examining for gas where it seemed that failure to get a cap at once would determine the quantity present to be at most a trace. Lack of shelter holes (a requisite by law) was noted by only a few of the candidates.

In spite of the foregoing comments, the results of the examination as a whole were creditable to the candidates. They were given a severe test of their powers of observation in a strange mine, with limited time, and responded to the test well. In conclusion, it is recommended that future oral examinations be conducted where possible along similar lines.

A careful comparison of the results obtained in the practical examination of mine workings, as demonstrated in the examination of the Bruceton mine and tabulated on the preceding page, will convince the most skeptical of the practical importance of such an examination.

Easily Constructed Separator

J. L. Ball, of Amsterdam, Ohio, in a recent issue of *Power* says: Much trouble was experienced in regulating the speed of a 14x7x14 direct-acting steam pump used for boiler-feed purposes, on account of the condensate cutting away the valve disks and seat of the throttle valve,



SEPARATOR IN STEAM LINE TO FEED PUMP

so we decided to make a separator as shown in the illustration. The result of our effort was somewhat crude, but it has done away almost entirely with the valve trouble. This separator was made almost wholly from old fittings, the baffle being a disk held between the nipple ends and having 12 holes $\frac{3}{16}$ in. in diameter drilled through it. It took two men about two hours to put it into service.

The Labor Situation

General Labor Review

A serious state of affairs exists in the region between Wilkes-Barre and Scranton. The Industrial Workers of the World have a strike in progress against all the operators of the section. They don't know just what they want as A. G. Lewis, an organizer of the United Mine Workers, has well pointed out, but they are opposed to as much as an 8-hr. day for miners, to dockage and to favoritism, though they have formulated no demands. In fact at a meeting of 700 members of the organization they voted "never to return to work."

The I. W. W.'s are endeavoring to hold up citizens for from $50 to $1,000 for the support of the organization. The union men generally want to work and many are doing so under the protection of the state police and deputy sheriffs, though all kinds of violence is threatened and much successfully accomplished, so that many believe it is more economical to stay at home and watch their properties than to go to work for the wage that may be obtained for a single day's exertions.

A strike at Nanticoke for better powder has just taken place, while one at Carbondale for more wages for motormen has just been ended by a threat of the union to enlist men to take the places of the strikers who, indeed, have no contractual grievance. The Lehigh Coal and Navigation men at Mine No. 10 are all back at work. Later advices state that the Navigation's Crystal Ridge and Harwood mines are also closed.

Securing Union Men at $10,000 per Member

The 1,400 men at the Cranberry colliery of the Lehigh Coal and Navigation Co., near Hazleton, struck on Sept. 12 because 100 men are behind in the payment of their union dues. It is strange that these men do not take warning from the button strike just concluded. Addressing the Conciliation Board on Sept. 11, W. J. Richards, president of the Philadelphia & Reading Coal and Iron Co., said that the endeavor to force four men into the union at Lincoln colliery during that strike had cost the miners $40,000 in wages.

The Conciliation Board on Sept. 11 was requested to make a ruling that the contract miners of the Taylor colliery of the Delaware, Lackawanna & Western Railroad Co., Coal Department, be awarded the payment for cars which reach the tipple without tickets and for which nobody is now paid. The miners believe the money should be divided. The company takes the view that it is liable for the payment of this money to any miner who may substantiate his claim. Should it award the money to the miners in general it might have to compensate, out of its own pocket, any individual who could prove his claim to any given car. The grievance was referred to the umpire.

The Allied Trades Council at Wilkes-Barre is endeavoring to induce the United Mine Workers in the Wyoming Valley to take part in a sympathetic strike with the striking trolley men who hope now to win because the enforcement of the ordinance against "jitney busses" passed by the Wilkes-Barre municipal authorities has wiped out that free-lance traffic and driven more jitneys from the streets. The Trades Council thinks a general strike would cap the climax, and in the universal stagnation the citizens of the Wyoming Valley would insist on the 11-month-old car strike being brought to an end.

Somerset County and the Kanawha Region

The Somerset County (Pennsylvania) field conditions are unchanged. The J. B. Kennerly operation at Pretoria, near Holsopple, is still idle. The Knickerbocker Smokeless Coal Co.'s mine and that of the Baker-Whiteley Coal Co., both at Hooversville, and the Stauffer-Quemahoning Coal Co.'s mine at Listie are still working on about the same basis as last week. The Hocking Coal Co.'s mine at Garrett and the mine of J. G. Beam near Berlin are still idle. The United Mine Workers' agitators do not appear so active as they were two or three weeks ago. Both cars and labor are in short supply.

Over 300 miners employed at Ivaton, Coal River, by the Ivy Branch Coal Co. have gone on strike because of differences between them and the superintendent. The officials of district No. 17 are making an effort to secure an adjustment. The charter of the Donwood local No. 1,931 of the United Mine Workers of America has been revoked because a strike was called without proper authorization.

In Illinois the union has decided to cease making its donations to members when the mine at which they are working closes down. Hitherto $5 has been paid each 45 days. This was only given when the mine workers were idle or unable to obtain employment. The officials declare that these donations cause "no end of friction and turmoil and in many cases actual fights, it being claimed that some members received the $5 and were working, and others, more deserving, were refused. Many other complaints were made." The last distribution was made Friday, Sept. 15.

Some union men in that state have been charged with going "to the Joplin and other districts in Missouri, as well as Colorado and elsewhere, securing employment in metalliferous mines and in some instances in coal mines" without depositing their union cards. They work under nonunion or open-shop conditions and yet keep up their membership in the union or join it on their return from the other district. The local unions are urged to penalize such men under Sec. 10, Art. XIV, of the international constitution.

Southern Indiana and the Southwestern States

The mine workers at the Indiana Creek mine near Bicknell, Ind., operated by the Indiana Creek Coal and Mining Co., went on strike on Monday, Sept. 4, for the second time within a week because the company employed nonunion men. There are 510 men at this mine.

In Kansas the miners have quite generally been striking to hurry along the negotiations of the conference. It was probably for this reason that the Kansas and Missouri operators decided to grant the demands of the mine workers' representatives. As soon as they did this the Oklahoma operators broke away from the conference, and a session is now being held with the Oklahoma mine workers' representatives at Muskogee, Okla. A few operators in the Henryetta district are opposed to joining the other Oklahoma mine owners.

In Texas the mine workers are still striking, there being 2,400 men out at Thurber, Strawn, Avery, Bridgeport and Newcastle. The conferences continue, but without result. In the rest of the Southwest, as has been noted elsewhere in these columns, the mine workers secured the increase of wage easily and found their crux in the arranging of working conditions. In Texas, on the other hand, all the trouble is about the price of mining and the companies seem indifferent about their rights and liberties.

Rioting in Anthracite Region

The Industrial Workers of the World appear to have largely concentrated their efforts in the field about half-way between Wilkes-Barre and Scranton at Old Forge, Avoca, Yatesville, Pittston and at towns with such fighting names as Dupont, Sebastopol and Inkerman. The recruiting work seems to have been done largely among the foreigners, the American mine workers remaining true to the union and desiring to continue work but being intimidated by the threats of the foreign Industrial Workers of the World.

For this reason there is almost no sympathy with the resistance of the strikers, and every scheme has been adopted to enforce law and order upon them. One project that seems likely to prove a solution is the deportation of unnaturalized foreigners who have been guilty of violence. It is said that there is a list of 25 men whose acts have proved them to be undesirable citizens. It is proposed that the immigration commissioner at Washington, D. C., deport these men wherever feasible to the country of their origin or interne them on Ellis Island or elsewhere till such time as their deportation can be effected.

The men are using all kinds of secret violence. They do not dare commit overt acts in the presence of the large number of state police and sheriff's deputies, but their secret methods are quite effectual, for they have prevented about half the union men in the towns affected from returning to work. Several collieries have been entirely idle and others

have shortages of from 40 to 75 per cent. of the normal working force. What is worse, where the rowdyism is rampant, the quiet, law-abiding men are being driven away.

There are about 40 state police protecting the United Mine Workers of America and, despite the fact that the organization has been urging on the legislature that it dispense with the police, the mine workers near Pittston seem well satisfied to make good use of their services. The U. M. W. of A. has long ago decided that their union and the I. W. W. cannot exist together.

Some feeling is being manifested against the coal companies because at times they will not work the mines when the mine workers at great risk to themselves appear for service. It is felt that though the operation of the mines might not be profitable, the men who have been loyal should receive more consideration.

State Police and Deputies Make Arrests

Arrests have been many. On Sept. 1 at Old Forge colliery Vito Belario was arrested for carrying steel knuckles, also for rioting and disorderly conduct, and received a fine of $5 and costs for the last offense, being held under $500 bail for rioting and under $300 bail for carrying steel knuckles. Not having the money he was lodged in jail. Mario Bolio and Ugio Pozzi, of West Wyoming, and many others have been arrested for picketing, and Dominick Foote, for carrying a loaded revolver. Three men have been arrested for dynamiting a home in Yatesville.

The burgess of Old Forge, Martin Memelo, has gone to Scranton till the strike trouble is over. He was thought to be secretly in sympathy with the Industrial Workers till the announcement was made that he had been threatened with death. Joseph Pilkonis received a note on Sept. 8 that if his son continued at work as driver at No. 10 shaft he, his family and his house would be blown to pieces.

The homes of Anthony Makoskie in Sebastopol and of Samuel Zarre in Yatesville were dynamited about Sept. 8. These men were union mine workers who refused to go on strike at the demand of the I. W. W. It is thought that the homes of these men were destroyed because they persisted in working. No one was injured, though 17 persons inhabited the houses.

Strike Gains In Extent and Loses in Intensity

The trouble is extending rather than becoming localized, nevertheless more men are now reporting every day for work. On Sept. 11, 500 Industrial Workers of the World at Jessup held a meeting and voted to join their fellow members in Old Forge and other points in a general strike. They say they intend to tie up every mine in the borough. The men are for the most part employees of the Temple Coal Co. and the Moosic Mountain Coal Co.

The Industrial Workers of the World has about 1,000 members around Jessup and they have been on strike at intervals. These men proclaim that they are chiefly protesting against the arrest of their followers in Minnesota and, according to one leader, they say, "The imprisoned workmen must be liberated; we want all contract work abolished; we want better wages and more respect."

A riot that took place at Dupont on Sept. 11 was so severe that Sheriff Buss, of Luzerne County, and the state troopers had to leave town with their revolvers drawn. A crowd estimated at from 12,000 to 15,000 persons gathered in the Dupont streets after a meeting at Avoca had been disbanded by the sheriff.

On the same day the steam pipes at the Jermyn mines at Old Forge were dynamited. Fifty deputies were sworn in who did strike duty at Dupont, Avoca, Duryea, Port Griffith, Inkerman, Sebastopol and Browntown. These deputies took the place of the state police who were called away to protect Wilkes-Barre from violence resulting from the suppression of the jitney busses. Six saloons in the borough of Pittston were closed down temporarily by order of the sheriff.

The situation is complicated by the character of the burgesses. They are for the most part of foreign extraction if not of foreign birth. The names of some of them follow: Griskonis, of Exeter; Eike, of Wyoming; Weiskerger, of Hugheston, and Mamelo, of Old Forge. They have been asked to prevent any further meetings of the Industrial Workers of the World.

The Italian consul at Scranton has appealed to the mayor of Pittston and to Sheriff Buss for the protection of his country men from unjust arrest. If he would show only an equal interest in protecting the lives of his nationals and those of Americans from the insurrectional violence of his other misguided nationals he would do far better service to Italy and to the Italians domiciled here.

Wage Scale and Powder Strikes

On Sept. 5, "motor" runners to the number of fifty-five went on strike at the Coal Brook colliery of the Delaware & Hudson Co., in Carbondale, Penn. As a result, 1,500 men and boys were laid idle. They returned to work on Thursday, Sept. 7. The union leaders said they would get other men to take the places of the motor runners if the latter persisted in going on strike.

The motormen believe they should get $2.47 instead of $1.97 per day and declare that their wages are lower than those assured them after the strike of 1912 and still further below those provided for in the agreement of the present year. Judging from the action at the meeting last week, the union found little merit in the motor runners' contentions.

On Sept. 6 two hundred miners at the Stearns mine of the Delaware, Lackawanna & Western R.R., Coal Department, went on strike, claiming that the powder supplied was of an inferior quality and that it merely cracked the coal and did not shoot it down. They demand that better powder be sold to them or they will not work.

Under instructions from union leaders, the 800 employees of the Lehigh Coal and Navigation Co. at No. 10 colliery who had been on strike for two weeks went back to work on Sept. 8, pending the arbitration of the difficulties.

Thomas Kennedy, president of the seventh Hazleton district, is a candidate for international vice-president in the United Mine Workers of America.

Oklahoma Leaves Association

Events have been moving with rapidity in the district dominated by the Southwestern conference. On Sept. 5 the mine workers in the Pittsburg district of Kansas struck in large numbers because they did not like the delay experienced in the signing of the contract. But the next day they went back to work.

But on that same day, Sept. 6, 8,000 miners in the southwestern Kansas field walked out. They also were disgruntled with the long delay. The conference had been unable to come to an agreement mainly because of a difference of opinion as to the right of the operator to refuse to hire a man without stating a reason. The mine workers claimed that the superintendents had been discriminating against union men.

The Kansas and Missouri operators finally yielded to the demands of President Howat and consequently 21 operators in Oklahoma withdrew from the Southwestern Coal Operators' Association as they had long considered doing. In fact the fear of the threatened secession had stiffened the resistance which the Kansas and Missouri operators had hitherto made to the demands of the United Mine Workers of America. The Oklahoma mine workers' and operators' representatives met at Kansas City on Sept. 7 and agreed to meet again within the past week at Muskogee, Okla.

The Oklahoma operators promised the mine workers' representatives that they would pay them the general wage increase provided in the New York interstate agreement. They also agreed to leave the working conditions to a conference. Nothing was said about the mine workers continuing at work while the details of the contract were being arranged, but the presumption is strongly in favor of that arrangement as most of the Oklahoma miners have shown every disposition to remain at work though the Kansas miners went on strike.

The advances promised to the Oklahoma mine workers on the old contract of 1914 are already being paid, and the employees received these allowances on the August payrolls for the work performed both in July and August. The companies will post notices agreeing to maintain this new schedule of wages and to accept a contract in which the working conditions of the agreement of 1914 are unchanged. It is hoped that the mine workers of Oklahoma and the international executive board will be quite well satisfied to see the contract thus sketched accepted, because the Oklahoma miners have always deplored somewhat the arrogant attitude of the Kansas leaders in the face of the unfavorable labor situation. The new Oklahoma body will be known as the Oklahoma Coal Operators' Association, and it will include operators who are producing about half the coal the state furnishes to the market. The severance of relations with the Southwestern Coal Operators' Association comes after 12 years of harmonious action.

On Sept. 9 the mines of the McAlester-Edwards Coal Co., at Pittsburg, Okla., were shut down by a strike of 200 mine workers by order of the district executive officers who stated that no wage agreement had been reached with this company. As technically there is now no agreement between miners and operators in Oklahoma, the miners are somewhat disposed to strike till a contract is duly signed.

New Apparatus and Equipment

Solderless Connectors

Soldered connections in electric cables, when properly made, are strong mechanically and possess high conductivity, but it requires no small amount of experience and care on the part of the workmen to make a soldered connection with these qualities. Not only is considerable

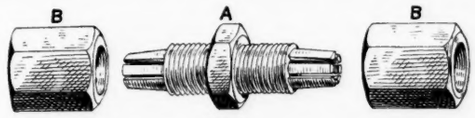


FIG. 1

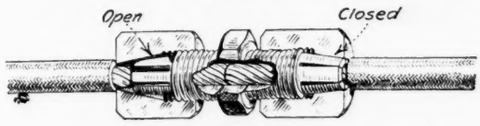


FIG. 2

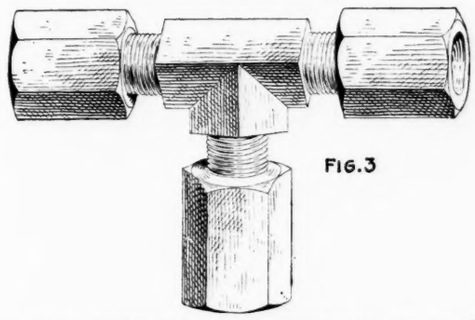


FIG. 3

FIGS. 1 TO 3. SHOW THE CONSTRUCTION OF FRANKEL SOLDERLESS CONNECTORS

time necessary, but always the use of some sort of heating device, which, at the best, creates a fire hazard. Furthermore, if a soldered connection becomes overheated the solder will flow out, and cables have been known to fall out of the lugs that connected them to the terminals of switches, etc., from this cause. To take the connection down always requires a heating device and considerable time, and if the connection is a splice in a large cable it is doubtful if it can be put up again without cutting the cable back of the splice. In many cases this cannot be conveniently done.

To provide a means whereby connections can be readily made in electric cables without the use of any heating device and with only the ordinary tools carried by an electrician, the Frankel Connector Co., 177 Hudson St., New York City, has developed a line of solderless connectors. Fig. 1 shows the part of one of these connectors used for making a straight connection in a cable.

The phantom view (Fig. 2) shows the principles of the connector and how the design permits the use of as few parts as possible to make a rigid connection. This simple construction reduces the liability of the connector's getting out of order and in addition provides a connection that is strong mechanically and electrically. Fig. 3 illustrates the type used for making a branch splice. The company also manufactures a complete line of connectors for panel boards to replace soldered terminal plugs for front and back connections.

By using solderless connectors in place of soldered ones there is a substantial saving of time as well as the added advantage of providing a joint that can be broken down quickly without harm to the cable.

In the report containing the approval of the Frankel "Solderless Connector" the Underwriters' Laboratories, Inc., states, regarding a test: "At 1,000 amp. the soldered joint melted and dropped from the joint. The joints where the wires were attached to the solderless connectors were unaffected by the test."

Golden Glow Projectors

The Electric Service Supplies Co., since its purchase of the Golden Glow headlight and lamp business from the Esterline Co., of Indianapolis, Ind., has perfected a projector having all the inherent qualities of the Golden Glow headlight and searchlight.

Projectors are often advantageously used for flood-lighting large areas. They have been found particularly useful for lighting sections of track or other places where construction work is carried on at night. They may, however, be advantageously employed anywhere where a considerable volume of light is necessary. The scientific principle upon which the Golden Glow projector is constructed is the effect produced upon the human eye by various qualities of light. It is well known that the light rays of high frequency such as the violet and ultra violet form the blinding, dazzling portion of white light. It is a common error to judge the illuminating qualities of any light by its intrinsic brilliancy rather than by its effects on the human eye. These effects may be well illustrated by looking directly into a high-powered arc or incandescent lamp, or at the sun. The reflector employed in these new projectors is based upon scientific principles. The source of light, or incandescent bulb, is mounted within a greenish yellow glass ground to a true parabola and polished and

PROJECTOR MOUNTED ON ITS BASE

silvered as would be the finest plate-glass mirror. The violet, ultra violet and other high-frequency rays are absorbed by this glass reflector and a powerful beam of golden yellow light, which is nonblinding and well adapted to penetrating fog, dust or mist, is thrown from the instrument.

These projectors are manufactured in two sizes, the smaller being equipped with a 9-in. diameter reflector and the larger with a 12-in. reflector. Concentrated filament lamps of any wattage up to 150 in G-25 bulbs, having a light center distance of 2¼ in., may be employed with a 9-in. reflector while the 12-in. reflector takes concentrated filament lamps up to 250 watts in G-30 bulbs, having a light center distance of 2¾ in.

Each projector is equipped with a focusing device accessible from the outside of the shell so that the beam of light by this central adjustment of the light center may be concentrated in a straight beam or made to cover a large area. The projector proper is mounted on a pipe standard which is adjustable in height and supported by a large circular base of light but durable construction. These projectors are readily portable on account of their light weight and are well balanced.

Stevens Underfeed Stoker

The attention that is being given to boiler-room economies has been the incentive among manufacturers of several types of stokers to perfect them for use with small-capacity boilers, say of 60 hp. and upward. Among these is the Stevens underfeed stoker, manufactured by the Nelson Blower and Furnace Co., of Boston, Mass.

The owner of a small-capacity steam plant should be interested in increased efficiency and increased boiler capacity, in the elimination of smoke and in reduced fuel bills, in the economical burning of low-grade fuel and in maintaining an even furnace temperature. All of these features are claimed for the Stevens stoker, besides simplicity in design and construction and small maintenance.

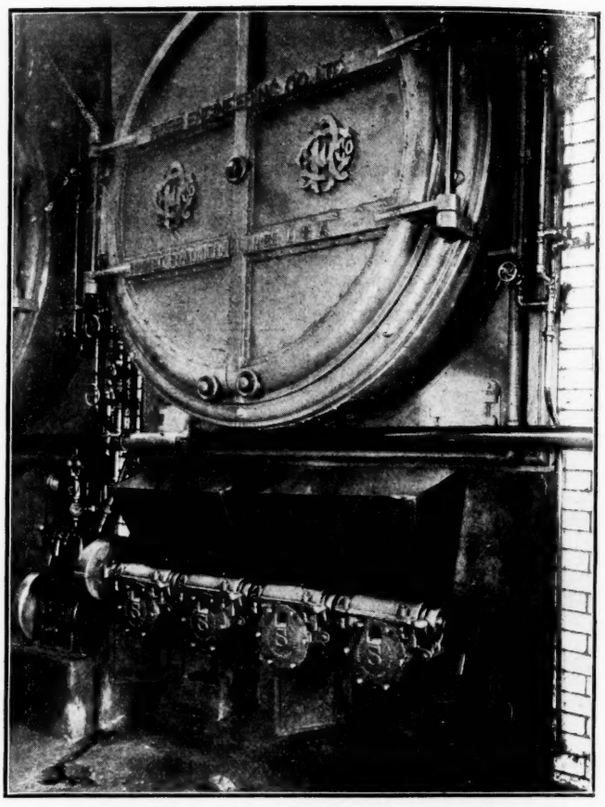


FIG. 1. STEVENS STOKER ATTACHED TO BOILER FRONT

The design of this stoker is such that it can be placed under any boiler without disturbing the side walls or bridge-wall and without excavating the ashpit or in front of the boiler. The general appearance of the device as it looks when attached to the front of a return-tubular boiler is shown in Fig. 1. An important feature of this stoker is the removable coal hopper that is fitted to the outer end of the worm trough. In the event of any derangement to the stoker, the hopper can be removed and the boiler fired by hand the same as if the stoker had never been installed. With this simple arrangement the possibility of any failure to maintain a steam pressure because of stoker troubles is avoided. The apparatus comprises a trough or troughs, according to the size, open at the top and extending from a short distance outside the boiler front to the rear of the furnace. In the bottom of each trough is a screw conveyor which is driven from the outer end by a worm gear and worm, the latter being driven by a small steam engine or motor. As the screw conveyor revolves, the fuel is spread evenly over the grate surface. The grates are of the dumping and shaking type. The stoker and grates are also designed for round furnaces such as used with the Manning type of boiler.

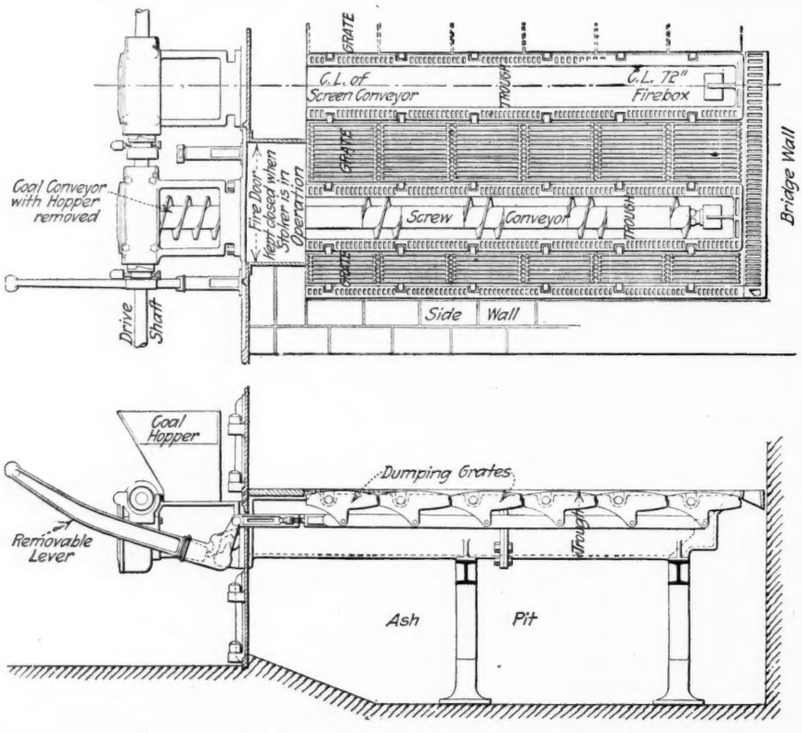
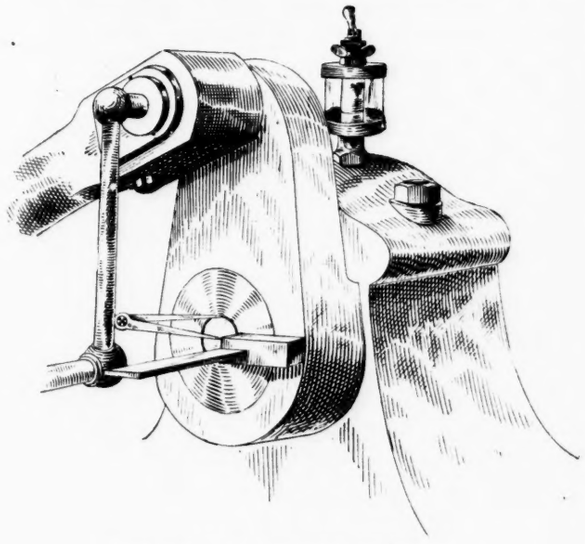


FIG. 2. PLAN AND SIDE VIEW OF THE STEVENS STOKER

Adjusting Centrifugal Oilers

A. A. Blanchard, of Ringwood Manor, N. J., in *Power* describes his method of centering an oiler ball. He says it can be set and tightened in about a minute.



SQUARE FOR CENTERING OILER

He takes a pair of dividers and scribes a circle on the end of the shaft around the shaft center, the exact outside diameter of the ball. Then he sets the carpenter's square up to this circle and brings the ball to the long blade and makes it fast. This method is accurate and rapid.

COMING MEETINGS

American Institute of Mining Engineers Arizona meeting, Sept. 18-25; technical sessions at Douglas, Bisbee and Globe. Secretary, Bradley Stoughton, New York.

American Chemical Society will hold its annual meeting Sept. 25-30 in New York City. Secretary, Charles L. Parsons, Bureau of Mines, Washington, D. C.

National Safety Council will hold its next meeting in Detroit, Mich., Oct. 17-20. Secretary, W. H. Cameron, Continental and Commercial Bank Building, Chicago, Ill.

National Exposition of Chemical Industries will be held at the Grand Central Palace, New York City, Sept. 25-30, 1916. Managers, Charles F. Roth and Adriaan Nagelvoort, Grand Central Palace, New York City.

New York State Coal Merchants' Association will hold its annual convention Sept. 21-24 at the United States Hotel, Saratoga Springs, N. Y. During the convention addresses will be given on the most uptodate time-saving methods for both office and yard. Secretary, L. V. Shepard, Elmira, N. Y.

Third First-Aid Field Contest of Wentz Companies

The Wentz companies held their third annual contest at Hazle Park, Hazleton, on Aug. 26, 1916. These companies are the Midvalley Coal Co., the Maryd Coal Co., the Upper Lehigh Coal Co. and J. S. Wentz & Co. In all there were 10 first-aid teams present and about 1,000 people upon the grounds. The scores were as follows: Upper Lehigh, No. 2, 92 7/16; Midvalley, No. 1, 92 1/16; Upper Lehigh, No. 3, 90 1/16; Hazle Brook, No. 1, 89 3/4; Maryd, No. 2, 87½; Upper Lehigh, No. 1, 86½; Maryd, No. 1, 84¼; Hazle Brook, No. 2, 82¾; Maryd, No. 3, 80 1/8; Midvalley, No. 2, 79⅞; Hazle Brook, No. 3, 79 7/16; Midvalley, No. 3, 78⅞.

In the afternoon the allied Wentz companies held athletic events, chief of which were shooting matches between the teams of the various collieries. The band of the Midvalley colliery enlivened the occasion with many choice selections.

Ex-District Attorney Bigelow spoke on the value of preparedness as strikingly exemplified in first-aid work. Some of the men might never have any actual rescue work to do, but they were ready should it unfortunately come their way. The Nation may never have to repel an invader or enter a foreign field of war, but that is no reason why we should not be ready in case the call of duty should unfortunately lead us face to face with conflict. D. B. Wentz, of Philadelphia, Penn., presented the cup and prizes and spoke words of generous appreciation of the volunteer "mine doctors" who had just shown their consummate skill.

The judges were Dr. Lake, of Kingston; Dr. Maurer, of Shamokin; Dr. Biddle, of Ashland, and Dr. Lathrop, of Hazleton—quite a distinguished group of first-aid experts. An elaborate luncheon was served in the grove.

The Sappers

By Berton Braley

Written Expressly for Coal Age.

When you read of a trench of soldiers
That's blown in the air a mile,
While the guns that flashed are broke and smashed
And the earth torn up in style,
You can write it down in your notebook
As soon as the dust cloud clears
That the canny chaps who ran the saps
Were the Army Engineers;
The human moles who live in holes
Where nary sun appears,
The grimy, gritty, far-from-pretty
Army Engineers.

They Tunnel Beneath the Foemen.

They are miners who come
from coal mines
To mine in the earth—
for Men!
They are trolls and gnomes
who make their homes
In a subterranean den.
So they tunnel beneath the
foemen
Till they've got the business right,
Then they spread the foe
for a mile or so
With charges of alamite.
They do their work in muck and murk
With neither shots nor cheers,
These sturdy, plucky, mired and mucky
Army Engineers!

They must dig their drifts in silence
And chop their way by hand,
And the dirt they pack on each sapper's back
And scatter it on the land;
For they mustn't leave any traces
Which the enemy sees or hears,
Or they'll get a lift from a counter-drift,
That's bad for the Engineers!
Yes, now and then they lose their men
Amid war's hopes
and fears,
They know the hell of
war full well
The Army Engineers,
The muddy, bloody,
sweaty, loyal
Army Engineers.

The Dirt They Pack on Each Sapper's Back.

Editorials

Due Time To Call a Halt

Though, in the past, *Coal Age* has consistently adhered to a policy of rigid neutrality in regard to the European War, it now feels that something should be said about the apparent tendency of the belligerents to encroach upon our fundamental rights in a manner that cannot but result in the most serious consequence to our commerce. These encroachments, if proved, will make it essential that this country stand firmly by its rights in order that, at least, the evil threatened may be prevented although it is too late to prevent like wrongs that may already have been perpetrated.

The British War Secretary, David Lloyd George, in a speech in the House of Commons said:

> It is the practice to communicate to other departments concerned any information on matters of public interest which may be obtained through the censorship for such use to be made of it as the particular department may consider advisable. . . . The Government is perfectly within its right in using any information which comes to it in these conditions for any public and national purpose.

Such a statement made in the face of protests on the part of our State Department, which characterizes the British censorship as illegal, must be viewed with concern. It has already been well established that estimates and bids on engineering work in certain neutral countries have been delayed so long by the British censors that the work has gone to English contractors before the American figures could be received.

Whether American quotations on coal are being opened and tabulated by the British censors "for such use to be made of it as the particular department may consider advisable" is not known. But if our correspondence to Norway, Sweden, Spain and other neutral countries is to be subjected to this indignity, it is time our Government took a positive stand in the matter.

It is but fair to state that the public's theories regarding Lloyd George's remarks may be wide of the mark. Robert Cecil, Minister of Trade, has openly declared what he is doing with the letters read by the Government authorities. If other departments are doing no worse there is, perhaps, no reason for alarm. On Aug. 25 he said:

> It cannot be emphasized too strongly that the general and statistical information extracted from trade letters, which has proved so invaluable to His Majesty's Government in checking the supply of material sent through neutral to enemy countries and suppressing the export of enemy goods, is used for these purposes solely and never for the purpose of substituting allied trade for neutral.

There has been a rebellion in Ireland. It may be surmised that the letters intercepted relating to that rebellion have been quite interesting to the Lord Lieutenant of Ireland, the Government of Ireland resting in a department of its own.

Furthermore, there have been plotters in the United States and other neutral countries. Great Britain, it is well known, is watching these enemies on foreign soil and she could not be blamed, surely, if the War Secretary handed letters on such matters to the Secretary of State.

Three departments have been mentioned, including that of Robert Cecil, and if need be more might be added, such as those of the Home Secretary and the Admiralty. But after all, Lloyd George said nothing to lead one to infer that the letters to which he makes reference were trade letters. He might have meant letters between relatives and between conspirators, though it is obvious from what Cecil has said that trade letters are being considered by the department of trade.

The English are interested in knowing what is happening to the nickel and rubber that they have sold to us under a guarantee. They want to know if their novel and in many ways benevolent blockade is working or must be made more strict to be as effective as that which the North enforced on the Confederacy.

America cannot blame them for caution in these and kindred matters, but they must be careful not to use the information for purposes of unfair competition. The Department of Commerce and Labor will be well justified in keeping a wary, though friendly, eye on the manner in which the information relating to private business deals is being used.

Our coal export trade is showing a most gratifying expansion. But far-sighted observers, looking well into the future, are not permitting themselves to be carried away with the prospects. It is well known that Great Britain is hard pressed for coal, which is automatically creating openings for the American product. But it is also known that in spite of her heavy borrowings she is retaining firm control of her foreign industrial holdings, and when once more the British producers are prepared to supply these operations with coal, the latter will not be long in dispensing with the American product.

Distance Will Fix the Freight Rates of the Future

The important decision rendered Sept. 5 by the Interstate Commerce Commission as to iron-ore rates from Lake Erie docks to points in western Pennsylvania, Ohio, West Virginia and Kentucky is suggestive of further work the commission may do in adjusting coal rates. The iron-ore decision involves about 25,000,000 tons of ore annually, a traffic yielding the carriers a revenue of about $20,000,000. The rates on nearly all the ore have been changed, most of these changes being reductions.

From the general viewpoint of rate-making, the outstanding feature of the iron-ore rate decision is the closer application of the matter of distance in fixing rates. It is only a few years ago that the railroads contended, expressing that contention with especial vigor in the case of coal rates, that ton-mile comparisons cannot be made, that the rate structure was too complicated and was based upon too important commercial considerations, to permit of the yardstick being applied to the map. At first the commission with much reserve introduced the principle of considering distance, but in decision after decision it has given more and more weight to compari

sons of distance, to the breaking up of long-established traditions.

The innovation is particularly marked in this ore rate decision. A prominent feature is the splitting of the previously recognized Pittsburgh district into three pieces. The Pittsburgh district as hitherto recognized had a rate of 88c. on iron ore from Lake Erie ports. Monessen, on the far side of the district, is now separated and given a rate of 94c., Neville Island, on the near side, is separated and placed with Aliquippa, giving it a rate of 70c., and what remains of the Pittsburgh district is reduced to 82c. The commission admits the propriety of grouping, but does not hesitate to establish new groups when the old groups appear to be too large.

What has occurred in the making of these new iron-ore rates is likely to occur in future decisions with respect to coal rates. There are two points involved: (1) The commission is yearly taking more interest in distance as the measure of what the rate should be; (2) the development of industry tends to make districts grow. At first pig iron was made, and iron ore consumed, in the district immediately surrounding Pittsburgh, but the industry naturally had to spread because it required room. Neville furnace, now taken out of the Pittsburgh district, was completed only about 15 years ago and was then the most northwesterly furnace in the district. The Monessen furnaces, now placed in a group on the far side of Pittsburgh, were completed only a few years ago and are the farthest removed of the district.

In the coal industry a similar growth naturally occurs. A few coal mines are opened and a rate is made for them. Later the development extends until the district becomes large and a splitting up naturally suggests itself.

Anthracite Price Investigation

The retail men of Philadelphia have apparently made good use of their opportunity to appear before the Legislative Investigation Commission, for they have put on record a plain statement of facts relative to the profits in their business. In a way they have established a precedent, as no other industrial enterprise has ever before been willing to let the public know just how much money it has earned and the manner in which it has earned it.

This investigation was ordered primarily by the State Legislature to ascertain if any increase in price had been made following the imposition of the coal tax law of 1913, and the dealers, except in a few isolated instances, have apparently established the fact that they did not advance the price of anthracite to cover the tax.

However, what the retail interests were most anxious to accomplish was to demonstrate to the general public the small profit made in the distribution of coal; this they have done quite satisfactorily. And in addition the retailers seem to have made a favorable impression upon the Commission; for one of its members, in complimenting an important witness on his frankness in giving intimate details of his firm's business, said, "In view of your testimony I cannot for the life of me see why you do not raise the price of coal."

It seems that the entire matter of the small profits accruing to the retail coal dealer hinges on the discrimination in both the freight rates and the wholesale prices of coal to the Philadelphia market as compared with other markets. This, then, brings the entire matter back to the long mooted question of freight rates, which has been a bone of contention in Philadelphia for a number of years. About a year ago, the Public Service Commission of Pennsylvania ordered a considerable reduction in freight rates, amounting in some instances to as much as fifty cents a ton. This order is now before the courts on the appeal of the railroads.

In the light of the testimony given at this investigation, it is probable that when the price commission reports to the governor on Jan. 1 its report will be not only favorable to the retail men in fully establishing the justness of present prices, but will in addition give added weight and support to the ruling of the Public Service Commission in ordering the reduction in freight rates.

The one disappointing feature of the investigation is the scanty attention the newspapers gave to the testimony elicited. The dealers have ably proved their contention that present prices are far from unfair, and while the consuming public was also offered a similar opportunity of presenting testimony, no one, not even the most biased of the newspapers, took advantage of the opportunity. Yet despite the convincing evidence of the justness of the retail prices, one of the more influential daily papers in an editorial says:

> The man with a house to keep warm will not be interested in the hair-splitting and refinement of detail that characterize the inquiry of the State Coal Commission. What the consumer will demand is the names of those who are squeezing him. The consumer will demand that the Coal Commission tell him the exact reason for recent turns of the screw. The statement of the retailers that the upward trend of coal prices is due to the illegal collection of a 25c. tax by the operators doesn't read well.

The worth of this opinion can easily be judged by the statement referring to a twenty-five cent tax. No one ever testified to that effect, for there never was such a thing. The only tax, as all coal men know (and all editors should), is that of two and a half per cent. on the mine price of coal, which never in any instance amounted to as much as ten cents on a single ton.

In view of the many misstatements and the prejudiced attitude of the daily press, it seems that the only opportunity for the retailers to get their case properly before the public would be to have the sworn testimony, as given last week, printed in pamphlet form and distributed to the public.

A Labor-Day Retrospect

On Labor Day the mine workers gathered to hear well-deserved encomiums on labor. It was represented as the basis on which the world rests. Without labor the speakers rightly stated we could have nothing. All this was used as a preamble on which to base a glorification of the workingman from whose fecund labors all our blessings are derived.

But then when the orator had passed from labor to laborer a mysterious forgetfulness came over him. He ceased somehow to realize that the glory of the laborer was in his laboring. After a rhapsody on the workman because he did so much for mankind, the orator commenced to urge that he do less, that he work only seven hours instead of eight. In short he really advocated that the workingman lower his production 12.5 per cent. and serve himself and the world with only 87.5 per cent. of his present efficiency.

And this in face of the fact that the orator had called attention to Basil Manly's statement that there were a large number of persons not making a living wage. So it looks somewhat as if the advice to those so distressingly situated would run thus: "You can barely live on your present wages. Try my plan and see if you can live on seven-eighths of them."

Perhaps the seven-hour day is coming. After all, labor is not everything in this world. The orator was wrong when he said so. Nor is product everything. It would profit us little, and in general it has in the past profited us little to gain the leading coal tonnage in the world and to forget the happiness that should go with the toil involved in such a record.

Some time we may be able to work only seven-eighths of a day and be housed and fed to our entire satisfaction, and we may learn how to use properly the rest of the time; but it is obviously impossible so long as the bulk of the people are not producing enough to assure them of what they regard as a living wage.

The seven-hour day means the seven-hour production. It can hardly be expected to be as prolific as eight hours. For eight hours has already been shown to be less productive than nine in the anthracite region, even though nine hours exceeds the length of time for which a man can put forth a continuous effort without tiring.

We cannot laud labor and the laborer truly when we are advocating that the latter shall do less work. We must cease to talk of the inadequacy of wages if we are going to say hours are too long. If we are going to argue rightly for shorter hours, we must close our eyes to wages and profits and declare, as we well may, that there is something in the world higher and better than food and raiment.

Limit the product of labor—by shorter hours, by ruling out machinery, by crippling capital, by hampering industry or by deliberately reducing the day's output—and labor will have less product to divide.

It would seem better, just at present, not so much to talk about the length of the working day as to call attention to those laboring men who will not cast their whole day's labor into the basket for division. Men like the contract miners, like the idle rich, and like the farmer orators who we see seated on the barrels at the crossroads stores—men like these—who do not do their part in the human economy, should have their hours lengthened. Then perhaps we might arrange to shorten the duration of service of those whose days now reach eight or even more hours.

The agitation doubtless has arisen largely because of the trouble with the contract miners. John P. White realizes that the argument is strong for a uniform working day, and that the operator is pressing it with public approval. But seeing that the miner does not want to work eight hours, White is disposed to take another course and advocate for all men what the miner has arrogated to himself.

If the public generally worked as intermittently and for so short a time as the contract miner, the buying power of the wage of mankind would be halved, or even worse. It cannot be believed that the public will stand for any large decrease in the length of the working day when once this is realized.

When the matter is rightly understood by the mass of workingmen, who are the wage payers as well as the wage earners of the country, they will take a hand to prevent a shorter workday just as a few of them are now endeavoring to stop strikes. The workingmen may be depended on eventually to see that only by toil can we have product and only by having the product of toil can we have the necessaries and comforts of life.

The Panama Railroad Contract

The recent bids for the Panama R.R. contract show the unusually strong position of the coal market. Between 500,000 and 600,000 tons were called for, and ordinarily the Government would be offered three or four million tons. This year, however, there were only five bidders, all on New River or Pocahontas, and the aggregate tonnage offered was only 630,000 tons, or slightly more than the Government would require. The lowest price was $3.40 and the highest $3.50, f.o.b. Hampton Roads, for the year ending Sept. 30, 1917. A year ago for the same contract there were twelve bidders, and offers on Pocahontas and New River ranged from $2.60 to $2.85. There will be little free coal available from any of the Southern ports for several months to come.

Safety and First-Aid

We have already announced that the Oct. 7 issue of *Coal Age* will be devoted wholly to the subject of safety and first-aid. In answer to our recent request a number of mining men have sent in contributions covering some phase of these broad topics for publication in this special number. We want a great many more such articles, so that we can make the coming Oct. 7 issue the *biggest* number of its kind ever published. Pick out something at your mine right away and send us a description, if possible having photos and drawings accompany the article to illustrate the text. There are safety devices at every mine and many of them, although old stories to the local employees, would be of interest to mining men in other fields.

Tell the industry what your company has done to promote safety and what progress you have made along first-aid lines. If you cannot describe some device, then tell us of the methods you have adopted for safety reasons, or the rules you have put in force to reduce accidents. We would also like to have 15 or 20 stories showing actual cases where neglect or disobedience caused accidents to life and property. In all such stories we will be pleased to withhold names of individuals and companies when a contributor so desires.

Although we do not hold it forth as the chief inducement, believing that each man's loyalty to himself and the industry he serves is the paramount incentive, we nevertheless call attention to the fact that every article printed in *Coal Age* is paid for at a liberal rate. All contributions must be in our hands not later than Sept. 27.

The $10 Prize Contest

Awards in the contest inaugurated recently in *Coal Age* and designed to benefit both the paper and the coal industry will be announced next week. We hope that all our readers will study the suggestions that are made, and if possible, comment on same.

Discussion by Readers

Electric Power Transmission

Letter No. 1—Having installed a number of electric-haulage systems at different mines, I was interested in the inquiry of Superintendent, *Coal Age*, Aug. 26, p. 362.

The case presented is one that involves a large line-drop and loss of power, which must be avoided if we are to secure the highest efficiency in the system. In order that a transmission of electrical power shall be efficient, the generating apparatus, transmission line and motors must all be efficient in themselves. Assuming that, in the present instance, the generators at the power plant and the motors at the other end of the line are equally efficient, the question is, How can the transmission line be made efficient?

The answer to this question will depend on the amount of copper it may be thought advisable to put into the line, both from a financial and a commercial standpoint. I will say that the loss of power in the line, or the line-drop, can be made as small as we choose to make it, when the question of expense is of no consideration. In other words, the percentage of line-drop, other things being equal, will vary inversely with the circular mils of copper in the wire that conducts the current from the generator to the motors. This percentage drop should not exceed 15 per cent. of the voltage at the switchboard in the power house. A 10-per cent. drop is preferable for good power transmission.

In the present case, the excessive line-drop (45 per cent.) will not only burn out the armature of the motor, but will also destroy the field coils. The motor will heat up, with the result that the insulation will be damaged and the efficiency of the machine impaired. This may be expected as the practical result of the excessive line-drop here mentioned.

Large Feeders Necessary for Efficient Transmission

In order, then, to make the transmission line, in this case, fully efficient, larger feeders must be installed. In making an installation of this kind, the question of future development should be carefully considered. More cutting machines, and possibly electric haulage, may be required before the mine is finally abandoned, and it may be advisable to make some provision in this installation for such increase of power.

In the present instance, I would suggest installing two lines of 300,000 circ.mils. For example, without increasing the voltage at the power house, as suggested in the answer to this inquiry, page 362, a wire capacity of 300,000 circ.mils will transmit 75 amp. a distance of 1 mi., allowing for return through a like distance, with a line-drop of 28 volts, which is practically 10 per cent. of the switchboard voltage, as shown by the formula,

$$Line\ drop = \frac{10.8 \times 2(5{,}280)75}{300{,}000} = 28.6,\ say\ 30\ volts$$

This will give, for the voltage at the end of the line, 275 — 30 = 245 volts as the pressure for operating the cutting machines, instead of the 150-volt pressure now available.

If a 15-per cent. line-drop be allowed, which would greatly improve the present system, a 0000-wire having 211,600 circ.mils. capacity could be used, giving

$$Line\ drop = \frac{10.8 \times 2(5{,}280)75}{211{,}600} = say\ 40\ volts$$

The voltage available at the end of the line would then be 275 — 40 = 235 volts, for operating the machines. The suggested change would require 275 × 75 ÷ 746 = 27 hp., which is practically one-half the power required in the present installation. The steam consumption would be reduced in the same proportion.

T. O. Hughes,
Windber, Penn. Mining Electrician.

Idle Days at the Mines

Letter No. 1—To the large number of petty button strikes mentioned in connection with the labor situation in the anthracite district, *Coal Age*, Aug. 26, p. 354, might be added the button strike of Aug. 19, 1916, at No. 2 colliery of the Delaware & Hudson Co., at Plymouth, Penn., which was caused by the failure of a few of the men to produce their buttons, because their dues in the organization had not been paid. As a consequence, the mine was thrown idle for the second time in a single month.

For these and similar reasons, idle days at mines are of too frequent occurrence to satisfy the honest miner who wants to work. As stated on the same page of *Coal Age*, "Many of the men want an excuse for a rest and a little recreation after steady toil. Some of them may even delay payment [of dues] in the hope that their delinquency will throw the mine idle."

Idle days at a mine not only cause dissatisfaction among a large majority of the men, but are a source of great loss to the company. In respect to the non-payment of dues in the miners' organization being a frequent cause of idleness, it would seem that a simple solution of the difficulty would be for the company to allow the collection of these dues from delinquent members of the organization, by deducting the amount from men on the company's payroll.

A Practical Suggestion

Another frequent source of idleness, however, while more tolerable than the button strike, is one that assumes considerable proportions at times. I refer to the practice of mine workers refusing to work on the day of a funeral of one of their members. With all due regard for the dead, it must be granted that a much more practical way of showing respect for a fellow worker who has died would be for mine workers, other than those of his immediate friends, to continue their work and allow the company to deduct 50c. apiece from each man who works the day of the funeral, on the next pay, the total amount

collected to be paid by the company to the dependent families or nearest relatives of the deceased. Certainly, such action on the part of the men would be greatly appreciated by those who mourn their loss.

At the colliery where I am employed, three funerals occurred last week, and the mine was thrown practically idle the same number of days. It is no wonder, in the unprejudiced mind, that such a practice causes dissension among the men, whose pay envelopes would look much better if permitted by their local to work that day, despite the small amount they would contribute out of respect for one of their number who has passed away. OBSERVER.

Wilkes-Barre, Penn.

Composition of Natural Gas

Letter No. 1—Kindly permit me to draw the attention of *Coal Age* readers to the following extract from the editorial pages of *The Canadian Mining Journal* of Aug. 15, 1916, in the hope that it will lead to a valuable discussion in regard to the general composition of "natural" gas.

It may be interesting, also, to discuss the point raised by the editor of the *Journal* as to whether the term "natural gas" describes a gas having a different composition from that of mine gas as it flows into the mine from blowers and feeders or escapes from the pores of the coal.

Following is the extract to which I refer, and which appeared under the above title:

> Mr. James Ashworth in "Coal Age," July 22, p. 146, objects to our criticism of the report on "Petroleum and Natural Gas Resources of Canada," in so far as this referred to analyses of natural gas. We admit that all he says regarding gas found in coal mines may be true, but this has no necessary connection with the composition of natural gas, unless Mr. Ashworth is prepared to prove that these two kinds of gas have the same origin.
>
> Bulletin 42 of the United States Bureau of Mines not only gives analyses of natural gas from many districts, all of which show no hydrogen, carbon monoxide or heavy hydrocarbons, although previous analyses of gas from some of these localities, by others, have given hydrogen, etc.; but it also explains the details of the methods of analysis and shows that the apparent presence of these constituents is due to a faulty mode of analysis. As this bulletin is the most complete study of the composition and methods of analysis of natural gas, up to the present, it is absurd for Mr. Ashworth to characterize it as "slight support." The most complete work of this nature published in Canada is in the Report for the Bureau of Mines (Ontario) for 1914. This corroborates the results given in Bulletin 42 entirely, and shows the complete absence of the constituents referred to above in the large number of samples involved.
>
> It is difficult to see by what process of reasoning Mr. Ashworth comes to the conclusion that we are of the opinion that "real natural gas is or should be pure methane." There is not a word in our criticism which would directly justify any such conclusion. The fact that Bulletin 42, to which we refer as an authority, gives a great number of analyses, nearly all of which show methane, should be indirect proof enough that we hold no such opinion.
>
> In the last paragraph of Mr. Ashworth's article, he states that "analysts of mine gases have failed to look for other hydrocarbon gases but have included them under the general term methane, which would appear to be the accepted conclusion of the writer of the editorial to which I have referred." There is absolutely not one word in the editorial Mr. Ashworth objects to, about the composition of mine gases, any more than there was about the nature of artificial gas, although we are aware that both hydrogen and carbon monoxide are found in artificial gas in large quantities.

Referring to the foregoing, I would like to ask its author to define what he understands to be (1) the composition of natural dry gas; (2) the composition of wet gas; (3) the composition of the gas driven off by heated crude oil; and (4) to state whether he considers that natural gas results from crude oil in the earth's crust, or from some other source; and, if the latter, then from that source it is created? JAMES ASHWORTH.

Vancouver, B. C., Canada.

Behavior of Gas on Steep Pitches

Letter No. 1—Reading the reply to the inquiry that appeared in *Coal Age*, Aug. 12, p. 281, in regard to "Removing Gas in Rise Headings," recalls some of my own experiences and observations of the action of blackdamp in pitching seams.

In the instances I will cite, the blackdamp was composed largely of carbon dioxide, which has a specific gravity of 1.529. Because of its greater density we are taught that this gas will accumulate in the lower levels of a mine, or at the floor of a working place, under ordinary conditions. In the cases mentioned, however, the conditions must have been extraordinary or unusual, as the blackdamp was found in the rise places and close to the roof.

The first instance occurred in a mine where the temperature was greatly above normal and blackdamp was generated freely in some old abandoned workings in a lower level. I do not recall the exact inclination of the seam but it was considerable. The heated blackdamp generated in the lower level found its way in large volume up the pitch to the level above, where it seeped through two old stoppings and flowed along the roof on the road in the upper level until it cooled sufficiently and dropped to the floor of the road. The temperature of the road was much lower than that of the gas coming through the stoppings, the heat of which could be felt by placing the hand at that point. Also, a sort of white mist was plainly visible and the damp tasted very acid. The mist may have been caused by the condensation of moisture, the damp being more or less fully saturated as it flowed through the stoppings.

Stratified Condition of Gas and Dust

A peculiar phenomenon was observed farther up the pitch where the damp had cooled and fallen to the floor. There was considerable dust suspended in the air above the gas, so that the line of demarcation between the damp and the purer air of the heading was distinctly visible. The dust floated more freely in the air than in the heavier gas at the floor, in a way that was interesting to observe.

On another occasion, we had to contend with a stubborn fire, on a pitch of 50 deg. The carbon dioxide generated by the fire, being heated, was carried up the pitch to the face and after cooling the gas dropped down along the floor of the ninth breast from the face of the breast to the gangway.

At another time, while I was employed as a fireboss on a pitch of from 70 to 80 deg., I found the fourth heading driven to the rise off the gangway full of blackdamp, where it was held because the intake current flowing on the gangway was much colder than the air and gas in the heading. They were blind headings, and it was difficult to free them from the blackdamp, which, I should say, was generated in the first breast off the

shaft. This breast had been made the intake for the current coming down the shaft. The intake current was very cold.

In other cases I have seen marsh gas stratified at the roof of an entry and blackdamp at the floor, with air flowing between them in a seemingly distinct channel.

Nanticoke, Penn. EDWIN C. CURTIS.

Safety in Removing Gas

Letter No. 2—The removal of gas from a room or heading is always considered by a fireboss who knows his business, from the standpoint of safety. He proceeds according to the amount of gas present and other conditions affecting its safe removal.

In this connection, the question of the distance apart of crosscuts on entries and in rooms has always appealed to me as an important one for a reason that is often overlooked. For example, while crosscuts between entries can be driven from both sides, the breakthroughs in a room can generally be driven from one side only, because the room adjoining may not have reached that point.

CONSIDERATIONS OFTEN OVERLOOKED

Suppose, for sake of argument, that the entry pillars in a deep, gaseous mine are, say 30 ft. in thickness and the crosscuts are started from both sides, about 10 ft. back from the face. If the crosscuts are 60 ft. apart, as customary, the entry and its aircourse are 70 ft. ahead of the air when the crosscut is started, and before "holing through," they will be at least 85 ft. in advance of the air passing through the last open crosscut.

Again, suppose the room pillars are 20 ft. thick and the breakthroughs here 60 ft. apart, as indicated in the Colorado mining law, the working face will probably be 75 ft. in advance of the air or even 80 or 85 ft. before the new breakthrough holes into the adjoining room.

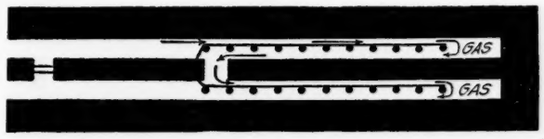
These considerations are often overlooked in designating the maximum distance apart of crosscuts and breakthroughs. The neglect frequently causes the fireboss much annoyance and trouble, as he is expected to keep the working face free from all accumulations of gas, and this may be a difficult matter where the face is advanced so far ahead of the air.

I have always advocated that it would be better, in the interest of safety, to make the maximum distance apart of crosscuts on entries, say 50 ft., and of breakthroughs in rooms, say 40 ft. Although this may somewhat increase the cost of operation, it is often an absolute necessity in very gaseous mines, especially where the working face is driven to the pitch and the gas has a strong tendency to hang in the face and is difficult to remove.

Let me illustrate: Suppose gas is discovered in the face of a heading that is 50 ft. ahead of the last crosscut. The gas is generated at the face and "tails out" toward the crosscut, at a point that will depend largely on the quantity of air passing. If 6,000 or 7,000 cu.ft. of air is passing through the crosscut, it is quite certain that much of this air will travel some distance up the heading and return, sweeping away a part of the gas. In this case, the gas will tail out at a point perhaps 35 ft. from the face of the entry. Then, assuming there is 3 ft. of gas at the face, the fireboss will estimate the volume of gas in the heading to be $35 \times 3/2 \times 8 = 420$ cu.ft., which volume will average a firedamp mixture at its most explosive point.

All will agree that if this body of gas should be ignited, a terrible explosion would result, especially in a dusty mine. The force and extent of the explosion may, however, be modified by the degree to which the mine has been freed from dust and watered. The question of how to handle such a body of gas is one that is almost always given at a fireboss examination. The question is asked: "State how you would commence to remove a large body of firedamp and what precautions you would take to insure the safety of the men. State what danger attends this work."

This question has often been answered in *Coal Age* and is illustrated in the accompanying figure, which shows an accumulation of gas at the face of each entry of a pair that had been driven a considerable distance ahead of the last crosscut, in violation of the mining law. As shown in the figure, in order to remove this gas, a line of brattice is extended from the outby corner of the last crosscut, along the rib to a point near the face, in each heading, the work being started on the intake entry and the brattice extended slowly to give ample opportunity for the gas to be swept away by the air current. The precautions



REMOVING GAS IN HEADINGS BY BRATTICE

necessary to be taken in removing gas in such cases, and particularly in rise headings, have been fully explained in *Coal Age,* Aug. 12, p. 281.

I cannot agree with Nels G. Bolling, in his claim, page 279 of the same issue, that in the erection of a brattice the gas may be ignited by a spark from a glancing blow of a hammer, although chemists claim that olefiant gas (C_2H_4) and ethane (C_2H_6) can be ignited by a spark. It is stated that when these gases are mixed with methane, or marsh gas (CH_4), they render the mixture more easily ignitible.

Farr, Colo. ROBERT A. MARSHALL.

Waste of Material in Mines

Letter No. 8—In the practice of coal mining, perhaps more than in any other industry, we have failed to appreciate the old saying, "It is the little foxes that destroy the vines." Applying this to daily practice, we find that it is the trivial things that are too often a menace to the health and life of mine employees, as well as making an important item on the cost-sheet of the mine.

A single spike lying in the road is of so little value that no man picks it up; or when sticking up in an old tie no one will take the trouble to draw it out with a bar. But, when a mule gets a loose spike in his foot, or a miner trips and has a bad fall over the spike sticking up in the old tie, the results prove beyond contradiction that the trouble in each case would have been avoided by the exercise of a little care in removing the cause.

Ties and wooden rails are of little consequence and often carelessly neglected, with the remark, "The com-

pany has lots of money." For the same reason, little lots of coal and old timbers, perhaps broken, are left behind in the waste, forgetting that their decay and slow combustion may, and often do, start gob fires that will require the expenditure of much money to subdue, besides throwing whole sections of the mine idle for a long period of time. Such results often follow a prodigal system of retreating, which work requires the exercise of greater caution than other kinds of mine work, and should only be performed by the most careful and experienced men.

Where the coal is cut by machines, it often happens that a machine capable of cutting coal at the rate of 24 in. per min. will only advance 8 or 10 in. in that time, while the cost for repairs and maintenance is proportionately large. A little investigation by a careful observer reveals the fact that the trouble lies in feed-line losses, which occur at poorly insulated points, defective joints in the power line or a "ground" caused by contact of the wire with coal or timber. At times, the return is at fault. It may happen that a loose wire comes in contact with a car that has been so charged as to knock one down when he touches it.

It is no wonder that, under such conditions, the expense of mining and motor repairs is often appalling and the system condemned, the claim being made that it is more economical to operate the mine on the old plan of pick mining and mule haulage, while the true solution of the problem needs a closer investigation to ascertain the causes of the losses and lack of efficiency.

A Word About "Boosters" in Mines

Much has been written about the need of installing a "booster fan" in a mine where the ventilation is deficient. Instead, I would "boost" some of the slate out of the airways and "boost" cement into the leaky stoppings, and, perhaps, "boost" some new stoppings into the places of the old ones, or "boost" the air current itself by short-circuiting the air where this is possible or splitting the current at one or more places.

Investigation may show that the present fan on the surface is inadequate for the future development of the mine, and another and larger fan may be required that will give the desired circulation. But, I would place such a fan on the surface where its operation can be watched by a capable mechanic and not put a booster underground to be looked after by an overworked fireboss or perhaps given no attention whatever.

In closing I want to say that economy and efficiency go hand in hand; they are the handmaidens of safety. And, further, eternal vigilance is the price of success in coal mining.

J. O. Durkee.

Masontown, Penn.

Mine Haulage

Letter No. 3—I was much interested in the recent references to the use of gasoline locomotives in mines, as we are using two "Ironside" gasoline locomotives, built by Son & Dyckerhoff. These are of the double, opposed, two-cylinder type of 12 and 21 hp. and weigh 5 and 7 tons, respectively. At present, we are only using the heavier machine, holding the lighter one in reserve.

The conditions of haulage here are somewhat peculiar. The road extends 1,200 ft. underground and has a very light grade in favor of the loads. The haul outside of the mine is 1,700 ft. from the mine entrance to the tipple, and on this stretch there is a grade of 2.5 per cent. for a distance of 400 ft. in favor of the loads. This grade is very hard to negotiate with the empty trips and limits the haul to sixteen 2-ton cars.

What I am particularly interested in at present is the cost of hauling. Our output is 750 tons of coal per day. The cost of the motors was $3,400 and $4,200, respectively. The operating expenses per day for haulage are as follows:

Gasoline, 20 gal. at 38c.	$7.60
Oil	1.70
Wages	9.15
Depreciation and interest, 5 per cent. on investment	1.91
Total	$20.36

These items show a cost of 2.715c. per ton—or 4.867c. per ton-mile of coal-haul, which seems high but is undoubtedly due to the adverse conditions of operation. As efficiency, which also means economy in operation, is the keynote of modern successful mining, it would be interesting to hear how other gasoline locomotives perform in comparison with the figures I have given. These motors were installed to replace a rope-and-tail haulage.

The disadvantage of having the exhaust gases of the locomotive discharged in the mine cannot be disputed. However, there is no doubt in my mind that, under certain conditions, gasoline traction will prove useful and economical, especially where gasoline can be had at a lower price than the present. The heavy grade of 2.5 per cent. against the empties, outside of the mine, is a particular source of trouble in the winter season, but we shall soon be able to avoid this difficulty, and the cost of haulage will undoubtedly be reduced when that is done.

Frank, Alta., Canada. P. M. Sherwin.

An Efficient Coal Miner

Letter No. 3—Having worked in the mines of the bituminous region of Pennsylvania for about 22 years, and having served in nearly all capacities, from trapper boy to mine foreman, I have been following with interest the discussion of efficiency in mining work. Most of my experience in digging and loading coal was gained while working with my father, who was as careful a man as ever entered a mine.

A miner's efficiency is determined by the careful manner in which he performs his work. His first duty on entering his place in the morning is to examine its condition and to see if the fireboss' mark is on the face of the coal. I can indorse all that Jacob Riley has said in his letter, *Coal Age*, July 29, p. 196, in regard to a miner keeping a sufficient supply of timber on hand for any emergency, and also in regard to his exercising necessary care in blasting the coal.

An efficient miner will never fire three or four shots at one time in one place, knowing the danger of knocking out the timbers and caving his place. Moreover, when more than a single shot is fired at one time, the miner may not be able to tell whether all the shots have exploded, and is in danger of being caught by a delayed shot on his return to the face.

Efficient miners are not plentiful today. I would say that foreigners form from 70 to 80 per cent. of the miners in the bituminous fields of this state. About all they know of mining is how to load their coal. This class of labor is very inefficient in a mine. The bituminous mine

law of Pennsylvania forbids any boy under 18 years of age loading coal in a mine, unless he is accompanied by an experienced person. I want to ask, Why should not the law forbid likewise the employment of a foreigner who knows nothing of coal mining and whose ignorance is a menace to the safety of all in the mine?

Another class of miners equally inefficient and dangerous are those who think they know better than anyone else and will not obey instructions. I remember on one occasion, when attempting to start a systematic method of timbering in a mine, some of the men quit the mine rather than set the timbers nearer to the face than was their custom, which was from 25 to 30 ft. back. Their argument was that they had worked in the mine 7 years and had never set props as close to the face as was asked.

The inefficiency of a miner is often shown by his standing a prop too close to the track where it could be knocked out by a car and cause the death of a driver, or by his reckless disregard of danger. The foreman or one of his assistants is often blamed for an accident for which neither of them is responsible. An instance of this kind occurred at a mine where I was working some time since. The assistant foreman had examined a man's place and found it safe a short time before the accident happened. After the examination, however, the miner fired two or three shots that he had prepared on a full cut of coal, with the result that several timbers were knocked out. Instead of replacing these timbers at once, the miner and his helper started to load the coal when the roof fell, killing one of them and badly injuring the other.

The place was practically safe when examined by the assistant foreman, and the responsibility for the accident rested on the miner himself, who should have reset the timbers that were knocked out before starting to load the coal. Such accidents will continue to happen until more experienced men are employed.

Nu-Mine, Penn. OLIVER YOUNG.

Shortage of Labor in Mining

Letter No. 3—Never before was there a time in the history of the coal industry in this country when coal miners were in such demand as they are at present. Most of the large coal companies have agents out hunting men. Great inducements are offered to good reliable men in order to bring them to the mines. The company will generally pay for the transportation of the men, their families and household goods.

As a result of these conditions, there is a class of miners who have come to feel quite independent and move from place to place, never staying long anywhere. The scarcity of good men has made it so that they are received with open arms wherever they go. The mine foreman shows a new man about the mine and offers him the best places he has to induce him to stay.

In many cases when a man has finished his room, if not given the place he wants he will pull his tools and quit. Indeed, it may be said of this class of miners that their heads are turned. For two or three days following pay day, they will not go into the mine, but visit with friends. The friend often leaves his place and comes to work where this one is employed, or the latter will go to work in the mine of his friend.

Miners are making little more money today than two or three years ago when work was less plentiful. At that time it was no uncommon sight to see 50 or 100 men about a mine waiting to see the foreman and begging for places in the mine. I remember a mine in the Pittsburgh district where the foreman would frequently offer a man a place if he would take two or three days on his own account and clean up an old room or do other dead work. Such treatment of men is manifestly unfair and will reap its own reward in time to come when men are scarce, as at present.

When discussing the foreign-speaking miner in *Coal Age* some time since, I stated that, in general, miners when well treated would not move about so frequently. In my own experience as foreman, I have tried to act on this principle. When times were hard and men plentiful, I never failed to pay men for what they did. At such times companies will frequently take advantage of the conditions to get as much out of their men as possible, and the miner has often been compelled to do work for which he could not expect to be paid. The foreman is not always the one to blame, although he must generally suffer the consequences.

In my opinion, it is a great mistake for coal companies to send an agent into another mining district with instructions to get men at almost any price. Such agents often exceed their instructions and persuade men that the proposed move will greatly better their conditions. Many of the men are credulous and go only to return in a short time with less of their hard-earned cash, but an experience that they remember.

I recall that one company where I was working imported 60 or 80 men, going to a large expense to fit up places for them to batch. In a single month there was not a half-dozen left, and in another month all had departed. As mine foreman, I have never asked a man yet to come and work for me, but have always done everything in my power to help my men earn a living. In my opinion, it is better to pay a man a couple of dollars extra and hold him, than to pay a new man more and lose him.

I try not to forget that I have mined coal myself, and I am never afraid to take the pick and show a man how to mine a stump or pull down a loose piece of slate with safety. It is such little acts that interest and hold men. Conditions at our mines are not ideal, but our men are not leaving us to any great extent.

I was greatly interested in the discussion of "Efficient Mine Foremen," just closed in *Coal Age,* and have always maintained that a foreman who has the knack of showing his men that he is their friend is the truly efficient foreman. To illustrate that contention, I may be pardoned for giving a bit of personal experience that came to me when accepting a position as foreman of a mine in the Pittsburgh field where the conditions were bad. I may say there was not a redeeming feature in the mine. I was told that 28 minebosses had preceded me.

The mine had the reputation of being a nonunion mine, and it was thought by the men that I had come there expecting to cut things down. As a consequence, every move I made was closely watched. There were a number of colored miners at work who were regarded as a source of constant annoyance and trouble. I can say with some little pride, however, that I stayed long enough at that mine to make the men, both white and colored, realize that I did all in my power to make them succeed; and during my stay the mine was fairly prosperous because of their coöperation and good will.

Heilwood, Penn. THOMAS HOGARTH.

Inquiries of General Interest

Explosive Limits of Gas

In replying to the question as to what reduction of air would render explosive a volume of 100,000 cu.ft. per min. containing 3 per cent. of marsh gas, *Coal Age*, Aug. 12, p. 282, I notice that the answer is given as follows: "The lower explosive limit of a mixture of pure marsh gas and air is reached when the gas is 7.14 per cent. of the mixture."

A textbook on "Gases Met with in Mines" that I have states, "When 1 part of marsh gas mixes with 5½ parts of air, the combination is at its lowest explosive limit." The same textbook gives for the higher explosive limit, 1 volume of gas to 13 volumes of air. These figures would make the lower explosive limit of firedamp contain 15.38 per cent. of gas, and the higher explosive limit, 7.14 per cent. of gas.

The next question in *Coal Age* asks, "What are the highest and lowest explosive limits and the maximum explosive point of mixtures of marsh gas and air? The answer to this question gives the higher explosive limit of pure marsh gas and air as a mixture of 1 volume of gas to 5 volumes of air or a mixture containing 16.67 per cent. of gas. Here again, the lower explosive limit is given as 1 volume of gas to 13 volumes of air or a mixture containing 7.14 per cent. of gas. Kindly explain this difference and state which is correct?

Hostetter, Penn. HUGH DONOHUE.

Authorities differ slightly in the exact proportions of marsh gas and air that mark the higher and lower explosive limits, but this slight difference is of no practical moment, inasmuch as marsh gas or methane (CH_4) rarely, if ever, occurs in a pure state in mines, but is associated to a greater or less extent with other gases that affect the explosive limits of the firedamp mixture.

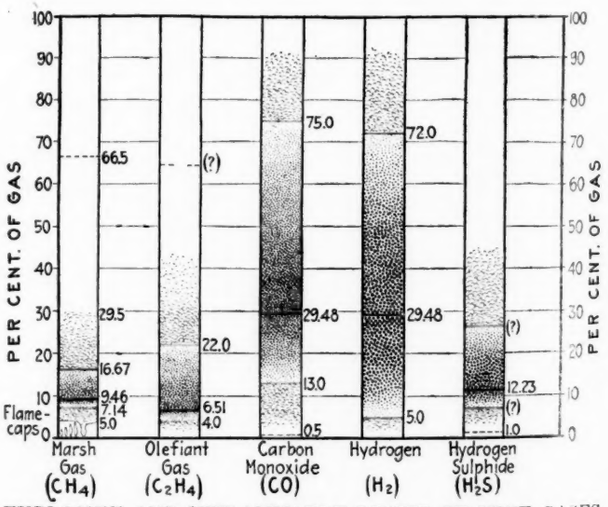
The two explosive limits of the mixture of pure marsh gas and air most generally accepted as applicable to mining practice are 1 volume of gas to 13 volumes of air; and 1 volume of gas to 5 volumes of air. The first of these two mixtures shows $100 \div (1 + 13) = 7.14$ per cent. of gas. The second contains $100 \div (1 + 5) = 16.67$ per cent. of gas.

The question of which of these two mixtures represents the lower and which the higher explosive limit of the gas has been viewed by mining authors from two standpoints: For instance, the chemist in the laboratory takes a volume of pure marsh gas and continues to add air until the mixture reaches the explosive point, which he is prone to call the "lower explosive limit" of the mixture. This he finds to be practically 1 volume of gas to 5 volumes of air. In other words, he must add five times as much air as he has gas at the start. He styles this the lower explosive limit because it is the first explosive condition observed in adding air to gas. He continues to add air to the mixture until he has 13 volumes of air to 1 volume of gas, when the mixture contains 7.14 per cent. of gas, which he calls the "higher explosive limit," because beyond this point explosion ceases.

In the mine, however, these conditions are reversed, and we start with a body of air to which varying proportions of gas are added as it comes from the strata. In this case, the first explosive condition or the "lower explosive limit" is clearly reached when the proportion of gas to air is 1 volume of gas to 13 volumes of air. As the addition of gas continues, the upper or "higher explosive limit" is finally reached and explosion ceases when there is 1 volume of gas to 5 volumes of air in the mixture.

Every practical mining man will agree that it is more reasonable to designate as the lower explosive limit of a firedamp mixture that proportion of gas to air which marks the first light explosion in the mixture and which occurs when gas mixes with the mine air in the proportion of 1:13. Also, the higher explosive limit is reached when more gas is present and the proportion of gas to air is 1:5. In that case the firedamp contains 7.14 per cent. of gas at the lower and 16.67 per cent. at the higher explosive limit.

The diagram shown here, giving the explosive limits, maximum explosive point and "life line" or fatal per-



EXPLOSIVE AND INFLAMMABLE LIMITS OF MINE GASES

centage for each of the mine gases, assists to make clear the true condition in mining practice. As illustrated in the methane column on the left, a little gas in the mine air first gives an increasing flame cap on the lamp, which flames at about 5 per cent. and the lower explosive limit is reached at 7.14 per cent., the maximum explosive point at 9.46 per cent., and the higher explosive limit at 16.67 per cent.

The inflammable zones are also indicated, the lower inflammable limit of pure methane being about 5 per cent. and the higher limit 29.5, beyond which the mixture becomes extinctive of its own flame, while about 66.5 per cent. of the gas is fatal to life.

Examination Questions

Mine Managers' Examination, Springfield, Ill., Mar. 6, 1916

(Selected Questions)

Ques.—From what cause is one explosive stronger than another?

Ans.—There are two general types of explosives that differ in their mode of action; namely, explosives that detonate and those that deflagrate. The detonating explosives used in mining belong chiefly to the nitroglycerin group, of which the best known is dynamite. In detonation the explosive wave is communicated instantaneously throughout the mass, giving rise to a greater heat concentration and increasing the strength of the explosive. In deflagration, the explosive wave is communicated from one particle to another by combustion, which consumes an appreciable time, affording a much less heat concentration and developing less strength in the explosive. Black blasting powder is the best known of this class of explosives. The size of grain of the powder affects the rapidity of its combustion and its explosive force.

There are therefore two characteristics that determine the strength of an explosive, namely, the type or class to which it belongs and the size of grain of the powder. This answer does not consider such conditions as absorption of moisture, freezing of liquid explosives, deterioration by reason of age of the explosive, the manner of ignition, or conditions under which the explosive is fired, all of which will affect the force of the explosion, but are not features of the explosive itself.

Ques.—Why are spring safety catches to be preferred to those operated by a weight or lever?

Ans.—A spring safety catch will always operate in a manner independent of the movement of the cage in the shaft. This is not true of catches operated by a weight or lever. When the cage is falling in the shaft, the weight that should operate the safety catches falls with the cage, its fall being only restrained by the friction of the latter in the shaft. This friction practically measures the force that the weight is able to exert to move the safety catches, which is very slight. Hence, safety catches operated by a weight and lever are practically useless in case the hoisting rope breaks, allowing the cage to fall.

Ques.—What is the weight of air in a room 30 ft. long, 22 ft. wide and 15 ft. high, at a temperature of 62 deg. F.?

Ans.—Assuming a barometric pressure of 30 in., the weight of 1 cu.ft. of air is

$$w = \frac{1.3273 \times 30}{460 + 62} = 0.7628 \text{ lb.}$$

The cubical contents of the room is $30 \times 22 \times 15 = 9{,}900$ cu.ft. Assuming the air is dry in this room, its weight is $9{,}900 \times 0.7628 = 7{,}551.7$ lb., or 3.77 tons.

Ques.—What is the weight of oxygen contained in the room mentioned in the previous question?

Ans.—Under normal conditions, the air being pure, the weight of oxygen is 23 per cent. of the weight of the air, or in this case $7{,}551.7 \times 0.23 =$ say 1,737 lb.

Ques.—Give six reasons why the great majority of steam boilers are cylindrical or round shaped.

Ans.—1. The circular shape gives a greater internal capacity, for the same weight of material used. 2. The circular form affords more uniform working stresses throughout. 3. It affords greater structural strength. 4. More easily constructed. 5. More easily cleaned. 6. The cost of construction is less per horsepower than would be possible by any other shape of boiler.

Ques.—If a ventilating current of 27,500 cu.ft. per min. is circulating in a mine under a water gage of 1.8 in., what will be the water gage if the quantity of air is increased to 50,000 cu.ft. per min., the conditions in the mine remaining the same?

Ans.—For the same conditions in the mine, the unit pressure, or the water gage due to the circulation, varies as the square of the quantity of air passing. In other words, the water-gage ratio is equal to the square of the quantity ratio, which gives, in this case,

$$\frac{x}{1.8} = \left(\frac{50{,}000}{27{,}500}\right)^2 = \left(\frac{20}{11}\right)^2 = \frac{400}{121} = 3.3$$

$$x = 1.8 \times 3.3 = \textit{say } 6 \textit{ in.}$$

Ques.—How much firedamp would have to be given off to foul a current of 6,000 cu.ft. of fresh air per minute, sufficiently to allow the presence of gas to be detected by the flame of a safety lamp?

Ans.—Assuming that the average fireboss can detect the presence of marsh gas, with a Davy safety lamp, when 2 per cent. of gas is present in the air current, the pure air will form $100 - 2 = 98$ per cent. of the whole current, which is $6{,}000 \div 0.98 = 6{,}122.4$ cu.ft. per min. The volume of gas required is therefore $6{,}122.4 - 6{,}000 = 122.4$ cu.ft. per min.

Ques.—Referring to the last question, without fouling the current more than mentioned there, what is the shortest time in which it would be possible to remove a body of undiluted gas entirely filling a pair of entries, each 300 ft. long, with four crosscuts each 60 ft. long, both entries and crosscuts being 5 ft. high and 8 ft. wide?

Ans.—The volume of gas filling these entries and crosscuts is $(2 \times 300 + 4 \times 60)\ 5 \times 8 = 33{,}600$ cu.ft. If this gas is 2 per cent. of the return current by which it is removed from the mine the total volume of gas and air will be $33{,}600 \div 0.02 = 1{,}680{,}000$ cu.ft. The quantity of air in this volume is then $1{,}680{,}000 - 33{,}600 = 1{,}646{,}400$ cu.ft. Since the quantity of fresh air passing into the mine is 6,000 cu.ft. per min., the time required to dilute and carry away the gas, in this case, will be $1{,}646{,}400 \div 6{,}000 = 274.4$ min., or 4 hr., 34.4 min.

Ques.—What are the four electrical units?

Ans.—The four electrical units in common use are the ampere, volt, ohm and watt. These four units measure the quantity, pressure, resistance and power, respectively of the electric current.

Book Reviews

Model Mechanical Handbook

MECHANICAL ENGINEERS' HANDBOOK—Editor-in-Chief Lionel S. Marks, professor of mechanical engineering, Harvard University and Massachusetts Institute of Technology. Pp. xxiii + 1780 + 56 index; 4¾x7¼ in.; illustrated, McGraw-Hill Book Co., Inc., 239 W. 39th St., New York, publisher. Flexible leather boards. Price, $5 net.

The present tendency in literature seems to run toward technical encyclopedias. The public a few years ago, were supplying themselves with large and authoritative dictionaries. Later came literary "libraries," then general encyclopedias of the Britannica type, and now there is a tendency toward the supplying of "handbooks" for professional men only. A few of these have appeared, but more are already promised. Of these recent publications perhaps the best is the Mechanical Engineers' Handbook.

Mechanical engineers are of two types—engine users and machine makers. This book recognizes the latter class more fully than did its predecessors. The work we associate with Reuleaux and Unwin has due consideration in this volume, and the department on Machine Tools and Machine-Shop Practice by L. P. Alford, editor of the "American Machinist," receives 65 pages, and this part is followed by 13 pages on Electric Drives, Industrial Management, Cost and Other Factory Accounts.

German Hütte Is Taken for Skeleton Outline

The book is based on the celebrated German book known as the "Hütte" now in its twenty-second edition. Some valuable material from that book has been incorporated in this volume by permission of the Akademischer Verein Hütte. While, however, the illustrious prototype of the Mechanical Engineers' Handbook contains much civil and electrical engineering, this book lays only such stress on these subjects as may rightly be considered within the purview of the mechanical engineer.

In order to make the book authoritative and valuable the services of 50 specialists were secured, some of whom supplied only short contributions regarding recent developments in their own somewhat restricted fields such as corrosion, air conditioning, fire protection, illumination and aëronautics.

Edward V. Huntingdon, associate professor of mathematics at Harvard University, provides both Mathematical Tables and Mathematics. Weights and Measures is prepared by Louis A. Fischer, chief of the Division of Weights and Measures, United States Bureau of Standards. The latter supplies a most complete series of conversion tables. The work of E. V. Huntingdon is a model in its condensation. He gives 30 pages to Calculus.

Mechanics—divided into the Mechanics of Rigid Bodies, the Stresses in Framed Structures, Friction and Hydraulics—is treated by three masters in the theory of Statics and Dynamics. There are many useful tables, especially in Howard D. Hess' section, which is devoted to Friction.

G. A. Goodenough discusses Heat and W. K. Hatt the Strength of Materials. The Materials of Engineering has 13 different expositors, including not only Louis A. Fischer, but an old friend of the mining industry, Ozni P. Hood, of the United States Bureau of Mines, who discusses Fuels of All Kinds. Richard Moldenke treats Iron and Steel Castings.

The section on Machine Elements has already been mentioned. Power Generation occupies an appropriately large place with seven editors for the various subdivisions. Hoisting and Conveying falls to C. Kemble Baldwin, and Transportation—Automobiles, Locomotives, Aëroplanes, Marine Engines and Boilers—falls to P. M. Heldt, E. C. Schmidt, J. C. Hunsaker and W. F. Durand. Building Construction and Equipment has sections on Building Construction, Reinforced-Concrete Construction, Industrial Buildings, Heating and Ventilation, Air Conditioning, Illumination, Prevention of Accidents and Fire Protection. The three closing sections are Pumps and Compressors (including fans), Electrical Engineering and Engineering Measurements. The latter section covers Measuring Instruments and Surveying, and with it are grouped some matters not akin to these subjects, but such as could not well be placed in previous sections; namely, Mechanical Refrigeration, Patents for Inventions, First-Aid Treatment and the American Society of Mechanical Engineers' Testing Codes.

The compilation of this book will add greatly to the reputation for practical scholarship of its editor-in-chief.

Raleigh County Is Surveyed

WEST VIRGINIA GEOLOGICAL SURVEY. COUNTY REPORTS 1916. RALEIGH COUNTY AND THE WESTERN PORTIONS OF MERCER AND SUMMERS COUNTIES—By Charles E. Krebs, assistant geologist, and D. D. Teets, Jr., field assistant. I. C. White, state geologist. Pp. xxii + 752 + 26 index; 31 plates; 9 fig. 6x9¼ in. cloth boards. Associated with the above is an atlas of the same size in cloth boards with folded topographic and geological maps of the entire area each in two sheets, one covering Raleigh County and the western part of Summers County and the other Mercer County. Also a separate soil report and soil map of Raleigh County. Pp. 34; 6x9¼ in. Paper cover. Price of above complete, $2.50 delivered. Extra copies of the geological maps 75c. each and of the topographic maps, 50c.

This report is extremely timely, coming as it does when Raleigh County is advancing by bounds. Eastern Raleigh, Summers and Mercer lie within the great New River and Pocahontas smokeless coal districts while western Raleigh has immense deposits of Kanawha splint and gas coals. In the Kanawha group is the well known town of Dorothy, on Clear Fork. Among the Raleigh County towns in the New River group may be mentioned Eccles, Lynwinn, Mabscott, Beckley, Raleigh, Lanark, Cranberry, McAlpin, Tams, Winding Gulf and Sullivan.

The Pocahontas measures in Raleigh County follow along the Summers County line and have been but little exploited. They cover only a small area. The Mercer County deposits are of the New River and Pocahontas groups. Among the best known coal-mining villages are Mora, Weyandotte, Matoaka, Hiawatha and Mannering.

Probably no other book is quite so comprehensive from the drillers' standpoint or contains more valuable and reliable drilling records. It makes a somewhat dreary presentation, of course, but the volume will be intensely interesting and valuable for those whose holdings lie in that section of West Virginia.

Geological Structure Simpler Than Topography

Little is said in the report about the anticlines and synclines. They are rightly treated as of wholly subordinate interest, though Pennsylvania reports the folds are followed with assiduity, as if geology consisted mainly in tracing them from field to field. There are three anticlines in the region treated, the Pineville, Mullens and Dry Fork arches, and three synclines known as the Pineville, Mullens and Weyanoke, but they change the structure but little and die away as they enter the area under consideration. The geologic structure of this region contracts strongly with the wildness of the topography.

From Freezeland in the east of Raleigh County to Jarrolds Valley in the west the measures dip steadily with a strike roughly N 45° E, the Pocahontas No. 3 bed being 3,300 ft. above sea level at the former place and less than 1,000 ft. at the latter. The structure lines are placed on the map with 50 ft. contours and bear evidence of careful charting.

The regularity of the structure is surprising, considering how near the West Virginia deposits are to points of great tectonic movement. The paleontological work by which the geologic horizons were checked was done by W. Armstrong Price. The work appears to have been most thoroughly performed and merits much commendation.

State Has 52 Minable Seams and 50 Unminable

A zincograph cross-section of the measures in West Virginia, 6x40 in., shows the names of all the beds of coal and their thicknesses from the top of the Dunkard to the base of the Pottsville series. This chart is sold separately for 25c. It shows that there are 102 separate beds of coal of which 52 are minable. Of the minable beds the Dunkard formation has 2, the Monongahela 5, the Conemaugh 3, the Allegheny 6 and the Pottsville 36, divided as follows—Kanawha group 22, New River group 9 and Pocahontas group 5.

Of the unimportant beds the Dunkard formation has 11, the Monongahela 2, the Conemaugh 6, the Allegheny 1 and the Pottsville 30, divided as follows—Kanawha group 12, New River 11 and Pocahontas 7.

The topographical surveys of West Virginia are approaching completion, though the western part of the state, which contains coal over its whole area, is well ahead of that along the eastern rim, the counties along that edge, which have little of mineralogical value, being left to the last.

Coal and Coke News

Harrisburg, Penn.

Arrangements for the examination of aspirants for mine inspector's certificates have been made by the members of the board named by the court for Luzerne and Carbon counties. The tests will be conducted at the auditorium of the Lehigh & Wilkes-Barre Coal Co. building, in Wilkes-Barre, Sept. 28, 29 and 30. The sessions will start at 9 a.m. It is also required that every man who has intentions of taking the examination give notice of the same not later than Sept. 23, to James Gildea, of Ebervale, secretary of the board.

The examination at this late date is due to the retirement of S. J. Jennings from the staff of inspectors. This leaves a vacancy and as the court was without a qualified man to name for the post, except Hugh McDonald, who resigned several months ago after serving 30 years as an inspector, it was directed by the Chief of the Department of Mines, James E. Roderick, that the examination be held. It is anticipated at this time there will be a large class at hand to take the tests.

A One-Sided Inquiry

With no one present to represent the public, the first public hearing to be conducted by the Pennsylvania Commission to investigate the increase in the price of coal was held on Sept. 7 in the city hall of Philadelphia.

Retail dealers were present in large number. They presented an array of figures to support their contention that they are conducting business at little or no profit.

Samuel B. Crowell, vice-president of the George B. Newton Coal Co., testified under oath that his company's net profits for seven months averaged 20c. a ton, and that for five months the company lost as high as 77c. a ton.

He asserted that according to the reports of expert accountants, the net profits of the 210 retail coal dealers in Philadelphia were less than in any other business.

Automobile delivery of coal has increased 10c. a ton in cost since 1913 because of the high price of gasoline, according to Mr. Crowell. The cost of delivery of coal has increased $80,000 annually to the Newton Coal Co. since 1913, due to the increased cost of coal, supplies and labor. The company operates 36 yards, 11 of which are leased from the Reading Co. and the Pennsylvania Railroad Co.

All the dealers testified that the operators are now charging 10c. a ton to cover the cost to them of the state tax on anthracite, which was enacted in 1915.

After the tax law of 1913 was declared unconstitutional the operators refunded to the retailers all money charged under that head. Today, the operators are charging 10c. a ton to cover the cost to them of the state tax law of 1915, but none of the operators stamp their bills "10 cents state tax" as they did under the previous law.

All the dealers asserted that they either had not advanced the price of coal to cover the state tax of 10c., or that they had refunded the money. The present prices of coal, which in some cases are 40c. above the prices of last winter, include the operators' advance and the general increased cost of doing business, according to the testimony given at the hearing.

All the dealers testified that there is a difference of 5 per cent. in the weight of a car of coal, as billed to them by the coal companies, and the actual weight when unloaded at their yards. They testified that this was due to many causes and although they had the opportunity to reweigh cars, the cost was prohibitory.

One of the causes of the difference in weight is due to the coal being freshly washed when it is loaded into the cars at the mines. The cars are weighed before all the water drains out. In the winter this means that dealers pay coal prices for ice.

Other causes are the too rapid running of the cars over the weighing scales, when the maximum car capacity is billed, if the weighman does not get the actual weight. Infrequent weighing of empty cars is another cause of the light weight. The testimony of all the dealers was alike in detail.

Chairman R. S. Gawthrop, of the commission announced that two meetings will be held in Wilkes-Barre at some future date, one for the operators and the other for the coal brokers.

Sunstroke Is Compensable

Counsel for the State Compensation Board has given his opinion that sunstroke is an accident within the meaning of the compensation act. The compensation board will meet about the middle of the month and will in all probability pass upon the question.

The counsel bases his contention on the ground that freezing of a member of the body has been held an accident by the members of the board. In view of the hot weather during the summer and of the many strokes suffered by employees engaged in furthering the interests of their employers, the decision proves of great interest.

The board has also been asked how long a time is extended to employees under the compensation act to seek compensation. Interpreting the act strictly the counsel for the board states that action to get compensation must be started within a year after the injuries were sustained and within one year after death of an employee.

If an employee is injured and even though the employer does not know of the compensation act and has not received notice from the compensation bureau that he comply with the provisions of the law, the employer is liable for compensation under Section 3, of the act, and cannot bring himself within the provisions of Section 2, which provides for common law action and defense.

After notice from the board the employer has 30 days within which to comply with the law and should an employee be injured during the period that employee may seek compensation. However, after the 30-day period has expired and the employer has failed to take heed of the provisions an employee may either seek compensation or bring an action for damage.

When the employer and employee agree that the third section of the act shall not prevail in the contract and that both shall be bound by Section 2, providing for damages in case of injuries to the employee, the agreement must be in writing in every case. A number of employers have asked for a form, to be prepared by the board, to incorporate in contracts.

Accident Harvest Is Large

Two hundred and forty-six workers were killed in the industries of Pennsylvania during the month of August. This is the highest toll of any single month during the present year. The total of killed and injured for the month was 23,817, a daily average of 882.

During the first 8 months of this year, 1582 workers have been killed in Pennsylvania and 166,084 killed and injured, a monthly average of 198 fatalities and 20,760 killed and injured. Those enormous figures are based on accident reports received at the Bureau of Statistics and Information of the state.

The accident reports received in August are greater in number, but indicate no unusual or particular causes for the increase.

In the Workmen's Compensation Bureau, 49,552 compensation cases have been entered, of which 1578 were fatalities and 47,974 nonfatal. Compensation agreements have been perfected for 592 of the fatal cases thus providing support for the following numbers of dependents; 418 widows, 130 parents, 1,055 children, 14 sisters, 5 brothers and 1 niece.

The accident reports by months to Sept. 1, 1916, are as follows:

Month	Fatal	Total	Daily Average
January	129	13,465	518
February	222	24,475	979
March	239	26,971	999
April	169	16,010	720
May	195	18,379	725
June	182	19,939	767
July	200	21,028	841
August	246	23,817	882
Totals	1,582	166,084	810
Monthly average	198	20,760	

Many Cases Are Settled

Since the first of the year approximately 49,000 compensation cases have been disposed of. In handling these cases no juries were employed, no witnesses called and no lawyers pleaded.

When the compensation law was fighting its way ahead in this state its opponents alleged that it would breed litigation. Employees, it was argued, would never be satisfied with their awards under any circumstances. Thousands of cases would find their way from the referee to the compensation board and then into the courts.

Those who were then defending the compensation law replied that experience in other states showed that only 3 per cent. of the cases were contested.

Pennsylvania has so far beaten the experience of other states. Out of the 50,000 cases more or less in which compensation was due only 1,000 have been taken before the referees. A great many of the 1,000 were adjusted without any formal hearing.

Of the cases in which the services of the referees were required, only 107 have been appealed to the compensation board. And of the 107 cases taken before the compensation board only 11 have been appealed to the courts. Eleven cases out of 50,000 will take up the time of judge and jury.

What the compensation law has actually saved in litigation expenses cannot be determined. The amount runs into the hundreds of thousands of dollars.

The eleven cases that have been appealed to the courts all involve principles that must be clearly defined so that the compensation law may work smoothly and uniformly.

In the case of Francis Poluskiwicz, of New Philadelphia, vs. the Philadelphia & Reading Coal and Iron Co. appealed from the decision of Commissioner Scott, the company contends that the defendant died as a result of pneumonia, the board having held that an injury received was a forerunner of the disease. Poluskiwicz fell and injured his chest. He was sent home and became ill with miner's asthma that developed into pleurisy and later into pneumonia.

The appeal filed by the Pittsburgh Coal Co. in the case in which James Smith, of Sturgeon, Allegheny County was awarded compensation involves a principle of wide application. Smith was putting a coal car on the track and the strain of lifting caused hernia. The coal company contends that Smith was predisposed to hernia. The compensation board held:

"The workmen's compensation law does not prescribe any standard of health or physical condition to which workmen of the state must conform to qualify for compensation, nor does it imply a waranty on the employer's part that he is free from latent disease or physical defect which may develop into serious injury if excited into activity through his exertions in the course of his employment."

The status of laborers who employ helpers as well as the question of whether an employee must be performing some specific scheduled task in order to be in the "course of his employment" is the issue in the case of Mable Equi vs. Kolle-Speth Co., both of Philadelphia. The claimant's husband was killed while visiting the scene of his laborers to make some inquiries about the work. He employed a helper, but was paid wages and purchased no materials. The board held that he was not a contractor, and was in the course of his employment when killed.

The insurance carrier takes the appeal in the case of Clarence Roller against Drueding Brothers, both of Philadelphia. Roller was employed in handling hides which contained some poisonous ingredient and his hands became infected. The employer contended the injury was not an accident. The facts are uncontradicted. The case involves an interpretation of the compensation law.

In the case of Anthony Neary against the Philadelphia & Reading Coal and Iron Co. the contention is that Neary declined to accept the services of the company physician. The coal corporation takes the appeal. Neary contended that while he had not consulted the company physician, he had employed a doctor who was "just as good." The board awarded him compensation, holding that the company had failed to establish the fact that the change in physicians had aggravated the injury.

The case of Mrs. Jacob Reitmeyer against the Lehigh Valley Coal Co. in which the company takes the appeal, involves intricate problems. The husband of the claimant was a miner. He was killed, and in computing his weekly wage the coal company contended that deductions should be made covering the amount of supplies purchased each week. The board ruled that there was no contract in evidence showing that the deceased miner had agreed to purchase supplies from the company, and that no reason for any offset existed. As a great many mining companies virtually compel their employees to purchase supplies from them, final decision in this case is expected to set an important precedent.

Frank and Ida Groner file an appeal from the decision awarding Sheriden N. Marsh compensation. The contention is that Marsh was a casual employee. He was injured while employed on a house that was being remodeled. Final decision in this case is expected to shed light on the problem of what is and what is not casual employment.

The compensation rights of a child born after the death of its father are involved in the case of Ida A. Irvin against W. M. Frost & Co., both of Philadelphia. The widow was awarded compensation for 300 weeks according to the compensation schedule. At the conclusion of the terms she was to receive 15 per cent. of her husband's wages as a guardian for her child, until the beneficiary reached the age of 16. The defendant

contends that when there is a widow or widower entitled to compensation no awards can be made to the children.

PENNSYLVANIA

Anthracite

Minersville—Fire was discovered recently in an unused gangway of the Oak Hill mine in Duncott, Penn., near Minersville, and the officials have sealed that part of the workings in an effort to extinguish the flames.

Conyngham—It is reported that a small washery will be erected at the abandoned mines of the Hazle Mountain Coal Co. at Black Ridge in the near future, and the culm banks will be prepared. It is estimated that three years will be required to do this work.

Hazleton—The Lehigh Coal and Navigation Co., which recently acquired the Cranberry Colliery, will remodel the breaker, build a washery and a new store building and will commence a campaign of extensive inside improvements, which will consolidate the Cranberry and Harleigh workings of this company.

West Hazleton—Still another improvement for the Cranberry Colliery of the Lehigh Coal and Navigation Co. has been announced. This is a stable which will be on the surface. It will be 120x38ft., and equipped with all modern appliances for the proper care of the animals housed. The plans for the store room and offices to be built are also in the hands of the contractors.

Scranton—Suit for $15,000 against the Lehigh Valley Coal Co. was started in the United States District Court on Sept. 8, by Alfred Marghette, a subject of the King of Austria. Marghette was employed by the defendant company in the Laurel Run mine at Hazleton and suffered the loss of a leg by a fall of rock.

Tamaqua—In an effort to revive a victim of a drowning accident at Lakewood near Tamaqua on a recent Sunday the attending physicians were using a pulmotor, which a first-aid man who was looking on noted was being operated too fast for the safety of the man it was to help. He braved the snubs of the doctors and pushed his way to the side of the stricken bather answering the command that he get out and give him air with the reply that he was already getting too much air. Then he took charge of the machine and with the skill of many such men in the Panther Creek region operated the instrument so that he won the respect of the crowd and the doctors and brought the victim of the accident to consciousness.

Nanticoke—Ground has been broken for the erection of the new hospital building which is being constructed by the Delaware, Lackawanna & Western R.R. Coal Department, for the benefit of its workers in the Truesdale, Bliss and Auchincloss collieries. This building will be located near the Truesdale colliery, and will be convenient to other mines in the vicinity. With its completion, it is hoped that there will be little or no delay in the treatment of injured men from the collieries.

Yorktown—The Lehigh Valley Coal Co. recently resumed operations at its Spring Brook washery, which has been idle for several months.

Bituminous

Uniontown—Prosperity now prevails in the vicinity of Uniontown to an extent which has not been enjoyed for a long time. The production of the mines and coke plants is as great as the labor supply will permit. The output of both coal and coke could, however, be increased if the labor shortage did not exist. Present conditions in the industry are considered as abnormal, the demand being greater than it has been for many months.

A cave-in occurring recently at the Royal Works of the W. J. Rainey Co. resulted in a temporary shut-down of the mines, pending the making of repairs. About 100 miners were for the time being thrown out of employment, and the coke plant at Royal was unable to operate to capacity. The cave-in occurred at the air shaft, but no one was injured, and no narrow escapes were recorded, as none of the men were working nearby.

Monongahela—August coal shipments at Lock No 5 totaled 8,851,000 bu., which was larger than the shipments of any previous month. Through Lock No. 4, the coal shipments during August aggregated 10,074,000 bu. Work on rebuilding the new inner Lock No. 4 is progressing rapidly, and it is expected that concrete work will be finished by the end of September.

Fire believed by the authorities to have been of incendiary origin on the night of Sept. 8, destroyed two coal tipples belonging to the Diamond Coal and Coke Co. Miners used dynamite in order to prevent flames from spreading to other buildings owned by the company. The loss was estimated at $25,000.

Pittsburgh—Consumers of coal who are planning to lay in a supply for the winter are finding prices considerably advanced this year and a general "howl" from householders who have to submit to the "high cost of living" in many directions is threatened. An increase of 10 per cent. over the high prices of last year is generally expected. It was learned at the sales offices of the Pittsburgh Coal Co. that whereas there was a general price of 9c. a bushel at the yards last year, the average price is now 10½c. and that this price is not likely to be less during the winter. From 1½ to 3c. a bushel is added for hauling, according to the locality in the city to which the coal is to be taken. The increase in the wages of miners and the large increase in the price of day labor, of which a great deal is needed in the coal business, are ascribed as the principal causes of the high price.

New Washington—Lands lying in Clearfield County and owned by the Clearfield-Cambria Coal Co. were sold recently at Sheriff's sale to satisfy mortgages held by the Jacob Tome Institute of Baltimore. The lands were sold for $50,000, but the name of the purchaser was not made known. The company's possessions comprise 186 tracts, several thousand acres being underlaid with valuable coal veins. Most of these tracts are located in Burnside, Chest, Bell and Greenwood townships and New Washington and Newburg boroughs.

Connellsville—The coke production of the Connellsville region for the week ending Sept. 2 was 401,110 tons, of which the merchant operators produced 162,220 tons, and the furnace plants 238,890 tons. Compared with the previous week, this shows an increase of production of 3,815 tons.

Connellsville has been selected as the location for a mine rescue station, which will be located at the fire department headquarters. Here various pieces of life-saving equipment will be located, and instruction in its operation will be given to classes from all the mines in this section. This station will be established without cost to the city, and the equipment will be for the use of the fire department, if necessary. The expense of this station will be assessed against the coal and coke operators of this section, a number of the operators having already expressed their willingness to co-operate.

In the first report of G. S. Harah, L. W. Fogg and Jorn R. Thompson, receivers for the Tower Hill-Connellsville Coke Co., which was filed on Sept. 1, it is shown that from Jan. 21, 1915, the date on which the receivers assumed charge, to July 1, 1916, the gross profits from the sale of coke and coal from the two plants of the company amounted to $272,691.28. It is stated in the report that the receivers have been keeping the property and equipment of the company in the best possible shape and that $53,851.28 had been expended for mine equipment, tenements, materials and supplies.

Holsopple—The old Victor mine, on the outskirts of the town, caved in on the morning of Sept. 5. The mine has not been operated for some time.

Morrisdale—Extensive preparations have been going on for several weeks, during which time 50 men have been employed by the Morrisdale Coal Co. in clearing a large tract of land, and converting the forest into a place of amusement for the benefit of the town.

WEST VIRGINIA

Montgomery—The Brotherhood of Mine Foremen and Mine Firebosses of West Virginia, recently incorporated, held a meeting a short time ago to discuss plans for extending the organization which promises to become one of far-reaching good in its particular sphere. Officers were elected to serve until the general election, to be held next May. A board of directors was also elected, constitution and by-laws enacted, and a number of other important matters attended to. The purpose of the organization is to raise the standard of the mining industry, to spread and instill better understanding of means for safeguarding the lives of those engaged in mining, and to increase the efficiency of mine employment.

Charleston—For the first time since the flooding of the Cabin Creek coal field, some coal mines are now in operation. The first mines to start were 12 mi. from the mouth of Cabin Creek. They are practically the only mines along the stream at which sidetracks were left standing. The work of rebuilding the branch line of the Chesapeake & Ohio R.R. from Cabin Creek Junction has been rapid, and it will not be long until the entire line will be in operation.

But few unmarried men remain in the Cabin Creek and Coal River region, and as a result the coal companies are having difficulty in finding carpenters to engage in rebuilding operations. At Kayford a woman with four children offered her services as a carpenter, saying that she could do as much work of that kind as any man.

Berlin—The Wyatt Coal Co. has begun work on a new tipple to replace the one wrecked in the Cabin Creek flood. This will be ready for use in about two months.

Omar—The Main Island Creek Coal Co., John Laing, president, is receiving bids for the construction of 3 mi. of railroad which will serve new mines to be opened by that company.

Thurmond—The Chesapeake & Ohio R.R. has received within the past 60 days 654 new 70-ton steel coal cars, while 336 more will be delivered by Oct. 1. In addition to these, 1,000 more cars of the same type will be delivered in the next few months.

ALABAMA

Birmingham—Some of the mines in the district, among them the Sipsey and Empire mines, have been compelled to suspend operation temporarily on account of the car shortage. Such places as can secure cars are working night and day.

Coal prices, retail and wholesale, are going up as the demand for the product increases. Retail dealers have announced an increase in the price of 25c. per ton over August prices. There has been an impetus in the coal-mining business throughout this district. The steady operation of all mines is assured for some time. If the car shortage does not hamper the shipments the tonnage moved within the next few weeks will be great. All indications point to a strong market for coal all the balance of this year.

KENTUCKY

Harlan—Wireless demonstrations have proven highly successful between leading Harlan County coal operators and Louisville, where many of the largest operating companies have offices. The work was planned several months ago, but was not perfected until a few days since, when tests were carried out successfully. Instant communication is had between the operators and their Louisville offices. It is said that wireless service will later be extended into other coal operations in this section.

Coal operators of the eastern Kentucky fields are beginning an active campaign for the opening of a road to the coast in order that the operators may ship coal consigned to South American ports without prohibitive freight rates. In some sections of the South American republics coal is selling at $40 per ton, and operators in this section are anxious to ship into that rich field. The Louisville Board of Trade is assisting in the movement, and, not only the railroads of this section, but the entire South are being solicited to help. Congress will be appealed to. Harlan and the Harlan County coal fields have offered large bonuses to get connection with the Southern road, but so far they have failed. The raising of a $50,000 publicity fund is now under way in Harlan County, and operators are contributing liberally.

Owensboro—Two men are under arrest here on the complaint of the West Kentucky Coal Co., which charges that they counterfeited brass trade checks which are sold to the employees of the company and used as currency at the commissary. It is alleged that the prisoners, who are charged technically with using the mails to defraud, mailed counterfeits to men at the mine camp and that these were then "cashed" at the store.

Whitesburg—Coal operators in the eastern Kentucky field report some trouble in securing cars, and are running short hours in some instances. Railroads, however, promise to remedy the trouble with little further delay. All roads are taxed to handle the big coal tonnage coming from the Elkhorn and Boone's Fork fields in Letcher County.

Gorman—(Fleming P. O.)—It is announced here that the Elk Horn By-Products Coal Co. will begin shipping coal from its new plant within 15 days, and by Oct. 15 mining work will be well advanced.

Hazard—Beginning Sept. 20 coal operators in the new First Creek field will make increases amounting to about 12 cars daily from their plants. This field is reached by the First Creek Branch of the Louisville & Nashville, completed several months ago.

Central City—The Western Kentucky Coal Operators' Association has leased quarters in the Wheeler Building on Broad St., and is maintaining headquarters there, with H. L. Tucker, president of the Rockport Coal Co., in charge. Mr. Tucker succeeds the former commissioner, D. Stewart Miller, resigned.

OHIO

Columbus—According to a report of James H. Pritchard, chief mining inspector and safety commissioner of Ohio, the 1916 coal production, if it is continued at the present rate, will come up to the tonnage in normal years. The report covers the fiscal year ending June 30 and deals with many phases of the coal-mining industry in this state. In 1913 the state had a record production of 36,285,468 tons, which was decreased because of a prolonged strike and bad industrial conditions in 1914 to 18,736,407 tons. Continued strikes in some of the mines and suspensions in others during the year 1915 had the effect of holding the output down to 22,627,046 tons. But judging from the output during the first half of the present year and calculating the later production on the activity developed in all mining fields it is believed the total output will be in the neighborhood of 36,000,000 tons. Increases in production are promised in Belmont, Guernsey, Tuscarawas, Jefferson, Meigs and Hocking counties. It is believed there will be a reduction in the production in Athens, Morgan, Jackson, Perry and Stark counties. During the fiscal year there were 85 fatal accidents in the mines of the state and there were 21 prosecutions for violation of the mining laws. Mr. Pritchard recommends that firebosses, whose duty it is to inspect mines each morning for "firedamp," be licensed by the Ohio mining department to insure competency and

greater safety. He also recommends that coal companies be required to keep on hand constantly a certain amount of approved mine-rescue apparatus for emergencies. He believes that the deputy inspectors attached to the department should look over these pieces of apparatus to see that they are in working order.

ILLINOIS

Springfield—The Springfield District Coal Mining Co. has contracted for the erection of a steel screening plant for its mine at Eighth and Hickox St. The mine was formerly known as the Woodside. It was acquired several months ago by the Francis Peabody interests of Chicago. A year ago the upper works were destroyed by fire. Since that time the mine has been operated with a reduced force. It is expected that this and other mines owned by the Peabody interests in the Springfield district will soon resume operations.

The Athens-Dawson Coal Co. has been incorporated with a capital stock of $60,000. The incorporators are E. H. Buckley and H. M. Buckley, for 13 years identified with the Sangamon Coal Co., and Sol Frisch. Offices will be maintained in the Rice Building. Two big mines have been purchased, one at Athens and the other at Dawson. The Athens mine is in operation and the Dawson mine is reported ready to start.

O'Fallon—Coal miners recently saved themselves by jumping when two special interurban cars, heavily loaded, collided as they were on the way to the so-called Nigger Hollow mine. One of the cars was stopped by an obstruction on the track and the other crashed into it. Miners standing on the platforms leaped just before the crash. Many of the miners on the cars were so badly shaken up that they returned to their homes.

Belleville—The Prairie mine, on the Louisville & Nashville R.R., one of the largest shafts in the Belleville neighborhood, opened recently, after having been closed down for more than a year. Poor market conditions caused the shut-down. About 200 men will be employed.

Carlinville—One of the largest coal veins in this section was reported as being discovered by the Ibbetson & Rinaker Co. when boring for gas on the Springdale school land, in Dorchester Township. In a report filed in the recorder's office here, it is stated that a 10-ft. vein was struck at a depth of 252 ft. The same firm filed information that on the Wilder farm it found a 7-ft. vein at a depth of 202 ft. In this vein a heavy flow of water was encountered.

OKLAHOMA

McAlester—Suit has been filed in district court here against the Adamson Coal Co., of Adamson, Okla., asking damages in the sum of $20,000. The suit was brought for Fri Stabinckis and Marnhat Stabinckis, father and mother of Victor Stabinckis, who was killed in a mine squeeze which killed 13 miners in October, 1914. Parents of the deceased who have brought the suit live in Patrashki, province of Suwalki, Russia.

WASHINGTON

Enumclaw—The fireboss and assistant fireboss of the Durham Colliery Co. were killed recently in an explosion of gas in the Durham mine. Investigation established that the explosion was due to gas ignited from open lights on the men's caps. The fan had not been running for 24 hours previous to the accident. The two inspectors entered the mine early in the morning and proceeded several hundred feet before running into the pocket of gas causing the explosion. Before the bodies could be reached, the fan had to be started and operated for some time to clear out the gases.

Foreign News

Edmonton, Alberta—Mine operators in the Edmonton district, because of the shortage of labor, have been employing Chinese to the number of 50 or 60. Thus far the experiment has not proved satisfactory, as the men taken on are not of a class accustomed to hard, manual labor.

Madrid, Spain—The Spanish government has issued a royal decree, establishing regulations designed to conserve the supply of coal in Spain. One of the restrictions requires that every municipality having gas or electric lighting systems must, in case the illuminant is produced by steam power, turn off one-half of the public lights at 10 o'clock each evening. Other provisions are equally exacting, and are taken with a view to relieving the serious scarcity of coal throughout the country. The enforcement of this edict, it is believed, will tend to avert a suspension of domestic industries, and to prevent a further rise in the price of coal.

Toronto, Ont.—The project of a municipal coal yard has been revived and is being considered by the Civic Board of Control. A committee comprising Property Commissioner Chisholm, Works Commissioner Harris and Engineer Couzens was appointed to investigate the matter. They reported that the charge of $8.50 per ton was excessive, and that coal could be laid down in Toronto f.o.b. cars at $6.05, but that the circumstances did not justify the establishment of a municipal coal yard as the city had no property suitable for a coal terminal with facilities for delivery by water and rail. The proposition may come up again in a modified form looking to the purchase of a stock to supply at moderate prices those who are compelled to buy in small quantities.

Personals

George Watkin Evans is making a professional visit into the interior of Alaska.

Fred Gallus has resigned the position he held as mining engineer for the Pine Hill Coal Co., at Minersville, Penn., and has reëntered the employ of the Lehigh Coal and Navigation Co., in the Lansford division.

H. La Viers, manager of the South East Coal Co., recently made a tour of the new coal developments at Seco and La Viers, Ky. Building work is starting off nicely at La Viers and will be rushed speedily forward.

E. G. Forsythe, for many years superintendent for the Plymouth Coal Co. at Portage, Penn., has severed his connections with that firm, and has assumed charge of a new coal operation in Clearfield County near the New York Central R.R. between Clearfield and Madera.

John Crooks, Sr., who has served for many years as mine foreman at the Hazle mines of the Lehigh Valley Coal Co., has resigned that post. The announcement of his intention to retire from service, owing to his advanced age, was made at the company's office. No successor has yet been chosen.

Thomas Kennedy, president of District No. 7, United Mine Workers of America, has been honored with nomination to the ballot that will be sent out for the election of international officers of the mine workers. He has been named as a candidate for the office of vice-president of the international organization.

E. L. Morris, general superintendent of the United Coal Corporation, has resigned that position effective Sept. 15, to take charge of operations recently purchased by himself and Samuel Gilmore, near Johnstown, Penn. The duties of the office vacated by Mr. Morris will be assumed by Edward H. Coxe, assistant to the president.

C. E. Tobey, former general superintendent of the coal department of the Delaware, Lackawanna and Western Railroad Co. and who resigned recently from the service of that company to enter the retail coal business in Binghamton, N. Y., made his start on Sept. 1. Mr. Tobey will sell only Lackawanna coal. He has leased pockets owned by the company and has excellent switching and delivery facilities. He is prepared to get his share of the business.

Obituary

Lee Rankin, superintendent of the Florence mine of the Youghiogheny & Ohio Coal Co., was recently robbed and shot by two bandits in the road, a short distance north of Martins Ferry, Ohio. The robbers made away with something over $8,000 of the company's payroll. Mr. Rankin was immediately taken to the Martins Ferry hospital, but died shortly afterwards.

William Seddon, of Brownsville, Penn., died recently of acute indigestion. Mr. Seddon was one of the founders of the Western Pennsylvania Mining Institute, now known as the Mining Institute of America. He was a man who had come up from the bottom of the ladder, as he begun by digging coal. He was born in Wigan, England, in 1850. After receiving a common school education in England, be began as a miner, and worked himself into a position which, in this country, would correspond to a mine foreman. After coming to this country, he applied himself to the study of mining in his spare time and attained high positions in several coal companies, being at one time general superintendent of the Monongahela Consolidated Coal and Coke Co. He is survived by a widow and two sons.

Industrial News

Norfolk, Va.—The four-masted schooner "Clara A. Donnell" has been chartered to load a cargo of 1,000 tons of coke at Norfolk for Barcelonia, Spain. The freight rate received by the owners is $23 per ton.

Boston, Mass.—For the first time in the history of this port, a shipment of coal in a barge is being made from Cape Breton. The barge is the "Laugen" and is in tow of the British tug "Cruizer." She has a cargo of 1,800 tons of coal.

Philadelphia, Penn.—A. A. Zane, for several years with F. W. Foedisch & Co., has commenced business under the trade name of A. A. Zane & Co., coal jobbers, with offices in the Real Estate Trust Building. The new company, it is said, will handle the output of two mines in Clearfield County affording a production of 500 tons daily.

Johnstown, Penn.—The local school board recently had a fine example of the rising cost of maintenance when bids were received for the furnishing of coal to the city schools. The bid of the Robertson Coal Co. for coal in the third district was accepted at $1.75 a ton. Last year coal was obtained for about $1.40 a ton, of the same quality and from the same mine.

Chattanooga, Tenn.—Prompt action on the part of the traffic bureau of the Manufacturers' Association of Chattanooga, has obtained withdrawal of a Transcontinental Freight Bureau order which would have advanced the rate on coke from here to San Francisco $2 a ton. The Durham Coal and Iron Co. and the Chattanooga Gas and Coal Products Co. have been shipping at the rate of 15 cars a week.

Louisville, Ky.—It is reported here that groups of Eastern Kentucky and Virginia coal operators are organizing with a view to engaging largely in export trade with South America. The purpose is, it is stated, to raise a publicity fund of $50,000, which will be used to direct attention to the opportunities. Representatives of the coal interests, it is said, will be sent to New York and to Washington to work for the project.

Boston, Mass.—Apropos of the Boston & Maine R.R. going into the hands of a receiver, shippers who have coal contracts with this road have made anxious inquiries as to the matter of future payments. In several previous cases, courts have held that current expenses should first be paid out of current receipts before the security holders of the railroad are entitled to any portion of the same. Purchase of coal to operate locomotives is a current expense, and consequently must be met out of the current receipts.

Boston, Mass.—The City of Boston is in a peculiar and grave predicament, being without a single bidder for its 17,000-ton contract to supply the city institutions with soft coal. This is due to the uncertain transportation facilities and other trade conditions, and local dealers have refused for several weeks to take on new contracts. Two of the largest local dealers have been approached by Mayor Curley in an effort to get them to help the city out of its difficulty. New bids have been advertised to close Sept. 21.

Cincinnati, Ohio—The Wyatt Coal Co., which is defending a suit brought against it in the United States District Court by the Hocking Valley Railway Co. for demurrage, alleges that the demurrage charges published in the railroad company's tariffs are excessive and discriminatory, and states that it has filed a complaint on this ground with the Interstate Commerce Commission, which is still pending. The right of the railroad company to recover a judgment for demurrage charges which may be held by the commission to be illegal is denied.

Hazard, Ky.—Contract has been let by the Kentucky River Power Co. to C. E. Carlin, of Welch, W. Va., for the construction of its main power plant, which will furnish power to all of the mines in this section as well as to the town. Through its temporary plant at the East Tennessee Coal Co.'s workings at Glomawr, the company is already furnishing current to eight mines and to the town of Hazard, and it has 10-year contracts with all of the mines around Hazard. Thirty miles of transmission lines are already up, carrying 33,000 volts.

Charleston, W. Va.—The Blue Creek Coal and Land Co. has sold the Kanawha & West Virginia R.R., a lateral line, to the Kanawha & Michigan Railway Co. It was built in 1906 from Charleston to Blakeley, a distance of 34 mi., to the center of a tract of 43,000 acres of coal land owned by the Blue Creek company, with 4 mi. of line on Gauley River. It is understood that the Scranton interests who built the road are contemplating the immediate development of the tract referred to, as the Blue Creek company is already conducting an operation in a neighboring tract.

Louisville, Ky.—Blame for the car shortage was placed on the railroads by the Industrial Traffic Managers of Louisville, after a recent discussion of the circular issued by the Interstate Commerce Commission. This organization is made up of traffic managers of the larger local industries and meets twice a week to discuss the situation. Instead of the shippers being unduly slow about unloading, these men concluded (although there are exceptions) the reverse is the case. It is the railroads which do not remove the empties from the side tracks after they have been advised of their unloading.

Columbus, Ohio—The Ohio Public Utilities Commission has ordered the Hocking Valley Railroad Co. to refund to J. E. McElfresh, of Delaware, Ohio, the amount of an overcharge on coal shipments in view of the reduction on Dec. 5, 1911, of the Hocking Valley rate from 75c. to 70c. from the Hocking field to Toledo and way points. The railroad company continued to charge the old rate pending an appeal to the Supreme Court, which it lost, and the Utilities Commission has in this case ordered a refund of the excess. It is probable that other cases of the same sort will be brought, the amount of the excess in the cases of 40 dealers who fought for the reduction being estimated at many thousands of dollars.

Market Department

GENERAL REVIEW

Anthracite trade active making up deficiency resulting from light summer buying. Bituminous demand becoming still more insistant. Reserve stocks at a minimum and efforts to increase production meet with little success. Middle Western situation remains firm.

Anthracite—The trade is busy working on the heavy influx of orders occasioned by the threatened suspension of transportation facilities. The market is somewhat less active, but on the whole more satisfactory than when urgent orders of all descriptions were being received. The recent statement of anthracite shipments shows a falling off in the stocks at Tidewater, which is attributed to the heavier movement to the West. Steam coals are active all along the line, and are likely to become more so as the season advances, because of growing scarcity of bituminous coal and the starting up of heating plants. Delivery to domestic consumers is delayed by a scarcity of labor in the retail trade, and could this movement be accelerated the producers would experience an even more urgent demand. There is a tendency noted on the part of the operating interests to commit themselves as little as possible over the future, in anticipation of higher prices later. The shortage is becoming so pronounced at Down East points that cargoes are going forward with any sizes that happen to be available for loading.

Bituminous—Recessions from the abnormally high levels touched during the threatened strike of the railroad employees were inevitable, but prices have in no instances fallen off to what may be considered the normal basis for this time of the year. Demand from large steam consumers, already urgent, is becoming more and more insistent as the season advances, while the output is disappointing and delays in the movement are more frequent. The results of the bids on the Panama Railroad contract, involving about half a million tons, show the excellent condition of the market; a gross tonnage of only 630,000 tons was offered as compared with between three and four million tons in ordinary times, while prices quoted range from $3.40 to $3.50 as compared with $2.60 to $2.85 last year. Stocks at Tidewater are at a minimum, with the result that loading for both coastwise and off-shore shipments is delayed. Consumers are generally willing to place orders anywhere that they can obtain prompt shipment.

Lake Markets—All efforts at the moment are concentrated on keeping up production in the face of the constantly increasing car and labor shortage. It is impossible to accumulate any reserve stocks, and an occasional instance is heard of where coal goes directly from the railroad car into the firebox. Operating interests are exceedingly hard pressed to meet their contract obligations, while consumers are crowding them for every possible ton of coal. Considerable extra tonnages shipped when the railroad situation looked serious, were absorbed without any difficulty when the anxiety from this cause was removed. Domestic business is also showing greater activity each week as the fall season approaches. One of the influences accounting for the relatively light stocks is the very curtailed buying for stocking purposes during the summer because of the high prices ruling at that time. Lake vessels continue to make the upbound trip light, because of the shortage of coal at the loading ports. Prices in the Lake trade are touching new high levels. The movement from the upper ports to the interior is at record-breaking proportions.

Middle West—Constructive influences continue to dominate all branches of the market, and though there has been some reaction from the flurry occasioned by the threatened suspension of transportation facilities, prices still continue firm at the full schedule, with even occasional premiums, and with the fall weather now in sight there is no possibility of any important reaction. With consumption at the heavy rate now in evidence, even a moderate car shortage this fall, is more than liable to create a runaway situation similar to that prevailing when the possibility of a railroad strike was a factor. Complaints are already general of the slow movement, and incipient congestions are reported at some of the important distributing centers. Some operators have no free tonnage of any kind for sale, and as a rule all the sales agencies are pulling in salesmen from the road. The walk-out of the Kansas miners will also throw some extra demands on the Middle Western mines.

A Year Ago—Unseasonably hot weather causes a sharp relapse in anthracite. Bituminous still benefiting by the general expansion in manufacturing. Export business continues to increase. Pittsburgh district consuming at a record rate. Lake tonnage larger.

BUSINESS OPINIONS

Boston News Bureau—Conditions affecting sentiment and prices are unprecedented. Opinions therefore have not the same value as in the past. The absorbing power is greater than ever before. Primarily, the influences making for the construction sentiment are first gold inflation and then the enormous earnings which are showing in every line of business and over-running treasuries. These earnings are now being paid out to a considerable extent in increased and extra dividends. There are no further attempts to criticize the sensational reports of business, because people see now that they are true. The time has come apparently when it becomes futile to hold general confidence in check. The old-schooled banker cannot understand the ability of the country to absorb such an enormous amount of foreign gold.

Iron Age—Producers and consumers of steel are so beset with delivery problems that for the time new transactions are taking a secondary place. The operation of mills is more satisfactory under September conditions, and some headway against accumulated orders should be made in the next six weeks. The outstanding fact in the present congestion is the small impression made upon it by the year's additions to steel-making capacity. A canvass shows that about 2,700,000 tons of ingots a year are represented in new openhearth furnaces started up since Jan. 1 and about 500,000 tons more will be in operation before the close of the year. This is an 8 per cent. increase on the 40,000,000-ton rate of steel production at the beginning of 1916, or less than the normal gain. There is little promise of any pronounced change in the relation of supply and demand from new capacity before the middle of next year, if then.

Marshall Field & Co.—Wholesale shipments of dry goods for the current week show very large gains over the corresponding period of a year ago, indicating that retail distribution is quite active. Road sales for fall and advance spring delivery are considerably ahead of the week of 1915. More customers have been in the market. Collections are much better than in the week a year ago. The market on cotton goods as well as many other lines is strong and active.

American Wool and Cotton Reporter—Big purchases of territory wool took place during the last week. The total sales of all kinds of wool amounted to 5,600,000 lb. Some mills are delaying their purchases in the hope that the market may decline, but they are losing sight of the fact that Boston prices are now from 8 to 15c. lower than those in the primary markets. No great change has taken place in the woolen goods market. Sales have been fewer than during the week previous. It is felt that summer fabric business is to be much larger in the future.

The Crop Report—As compared with the August report the figures showed a decrease of 154,000,000 bu. in the indicated yield of the four great grain crops. As compared with September, 1915, the report showed decreases of 275,000,000 bu. in corn, 370,000,000 bu. in wheat, 177,000,000 bu. in oats, and 39,000,000 bu. in barley, or a total of 861,000,000 bu. shortage for the four grains.

Bradstreet—Elimination of the railway strike, for the time being at least, very high prices for cereals, extraordinary quotations for cotton and record high wages make up a quartette of remarkable features upon which trade conditions center. With the railway strike out of the way, business interests breathe more freely, the concern and feverish spot buying incident to embargoes have been superceded by optimism, and business as well as industry moves along to the tune of smart activity.

Dun—Business in nearly every line and in all sections of the country is going ahead at full speed. The halting tendency of the preceding week, due to the shadow of the threatened railway strike and the absence of many thousands of Labor Day vacationists, has been succeeded by activity, which shows no signs of slackening. The strength of the situation is reflected in the steady call from every section for all classes of merchandise, even in those districts where smaller crops would ordinarily have resulted in more or less depression. Commercial failures this week in the United States are 243 against 277 last week, 273 the preceding week and 274 the corresponding week last year.

Dry Goods Economist—With distributers of dry goods anxiety prevails as to the effect of the present high prices. With this is coupled a strong desire for some way of forecasting with a fair degree of accuracy the future price tendencies. The same is true of manufacturers, and in even a stronger degree, since they have to look still further ahead than their customers.

MARKET OPINIONS

The current market situation as viewed by some of the leading companies is:

Vulcan Fuel Co., Savannah, Ga. (By W. J. Ryan)—The present market is good, with the outlook the same, and the movement both on prompt and contract fair. Moderate premiums are obtainable on spot coal, and there are slight advances on contract. Floods and car shortages have tended to stiffen the market up and show every indication for making the demand for spot coal more urgent than ever before.

Colorado Fuel & Iron Co., Denver, Colo. (By J. F. Welborn)—The situation in the present market is unsatisfactory, with prices down close to the cost of production and the demand substantially less than the productive capacity of the mines in this section. With normal fall and winter weather conditions, an improvement in both the demand and prices is anticipated in the territory between the Missouri River and the Rocky Mountains. Prices are not materially different from a year ago.

Western Fuel Co., San Francisco, Calif. (By James B. Smith)—The current market is good, and the same may be said of the outlook on both the prompt and contract movements. Ruling prices are higher than at this time a year ago.

Pickands, Brown & Co., Chicago, Ill. (By J. A. Galligan, Sales Agent)—The present market is good, and the outlook unusually bright on coke. Our plants are taxed to their full capacity, and the movement is fully up to expectation. Prices on both contracts and the spot market are materially higher than a year ago.

Thorne, Neale & Co., Inc., Boston, Mass. (By E. F. Larrabee)—There is a good demand for high-grade Pennsylvania coal, and the outlook indicates a steadily increasing market. The movement is fair, and there is not much free coal above contracts. Prices rule from 25 to 50c. higher than last year. Indications point to a good demand a little later, and prices should touch higher levels than last winter for quick shipment or coal in transit.

Quemahoning Coal Co., Baltimore, Md. (By J. Edward Hibline, Mgr.)—The current market is very good, insufficient coal being mined to take care of all the business offered. Indications point to a continuous shortage for coal during the next two years. The prompt movement is fair, and contracts good. Spot prices are about 60c. per ton higher than contract figures now being offered.

William E. Marks Coal Co., Worcester, Mass. (By William W. Marks)—The demand is heavy, with prices gradually strengthening, and from 25 to 40c. per ton higher than a month ago. The outlook is very bright for fancy prices, but discouraging as regards transportation. The indications are that the growing shortage of both cars and miners, together with the anticipated embargoes, will shortly develop a scarcity of coal. The prompt movement is less than normal, and the contract movement about 50% of normal. Spot prices are about the same as a year ago, or perhaps a little higher, but contract quotations range about 25c. above those of last year. In view of the present car supply, shortage of miners and heavy demand, indications point to $3 coal before Jan. 1 if the current difficulties are accentuated by embargoes; eliminating this latter factor, there will be plenty of coal taken readily at $2.50 before Jan. 1.

J. W. Dykster & Co., Detroit, Mich., (by J. W. Dykster).—The market is very satisfactory, and orders are booked 30 days ahead, but the production is substantially below requirements. The coal business never was any better, not even during the strike of 1902. Consumers who delay putting in their supply will find themselves in a most serious predicament. Conditions as to labor, car supply and transportation are getting steadily worse.

Ajax-Hocking Coal Co., Baltimore, Md., (by James G. Pugh, Gen. Mgr.).—The market is obvioulsy abnormal. Prices are fictitiously high and unstable compared with existing industrial conditions, but promise to be even much higher because of the general labor shortage. The prompt movement is fair, and contract movement good. Prices as compared with a year ago both in the spot and contract business are much higher. Labor shortages and rush demands in all industrial lines have developed an unusually abnormal situation, but the foundation is unstable. Undoubtedly a readjustment of industrial conditions generally will result in more stable conditions at profitable prices, but such readjustment will be long drawn out, and will be accompanied by violent fluctuations.

Atlantic Seaboard

BOSTON

Market continues very strong. Hampton Roads coals command good prices, but tonnage not heavy. High prices for coal alongside Boston. Georges Creek receipts almost nil. Pennsylvania shippers well supplied with contracts. Anthracite scarcity becomes serious.

Bituminous—New England is feeling many of the effects of a coal scarcity. For coastwise shipment spot Pocahontas and New River are held for $4 and up, f.o.b. Norfolk, and the demand from consumers for deliveries on contract gets more and more insistent. Slow loading is the rule and delays are sure to multiply. Already certain of the larger plants have been forced into the open market. Practically every Hampton Roads shipper is declining business, and with such a situation in September there is no telling where prices will go. Output is disappointing and the demand off-shore only increases. There is no particular excitement here over the prospect; it is just a case of everybody doing his best to scrape by.

The City of Boston for harbor institutions recently asked for bids on 19,000 tons, and got only one bid on 2,000 tons at a price of $6 48 delivered, $3 higher than in 1914. The city has fuel to run these institutions until Dec. 1, but is obliged to buy requirements from that date forward. Spot cargoes have been quoted as high as $6.75 alongside, and it is rumored that an offer of $7 on cars, Boston, for 5,000 tons New River coal was declined.

The embargoes in force Aug. 30 to Sept. 4 seriously interfered with movement all-rail and furnished another reason for an advance in prices at distributing points. Hitherto this season deliveries all-rail have been quite regular and have done much to allay the anxiety caused by nonarrival of water coal. The differential in favor of rail coals even when the latter are $2 @2.50 at the mine is considerable.

So difficult is it to get Hampton Roads shippers to accept boats on contracts that notwithstanding a supposed active demand for vessels, several carriers are at Norfolk waiting orders, and others are being sent with no assurance that any of the agencies will accept them. There is bound to be a very serious situation on Hampton Roads coals and things are developing fast.

Georges Creek shipments for this market are in a far worse way than New River and Pocahontas. Receipts here are practically nil and there is much apprehension among consumers who have coal due them. There is none available at either New York or Philadelphia and steamer and barges usually carrying to this market are still being loaded with other coals. No sign of improvement is observed and unless mining operations are resumed on a normal scale there will be an absolute dearth of this grade all winter.

It was noticed that no Pennsylvania coal of any kind was offered the Government for the Panama R.R., a fact which shows how closely sold up all the large shippers are. Several are announcing to the trade their inability to accept further orders. A number of small operations that were closed down during the summer are now starting up and naturally are obliged to make inducements to labor.

Prices advance almost from day to day, at Tidewater as well. Consumers with contracts are particularly anxious now that Southern shippers have come into the all-rail market to buy for plants where they are themselves behind on deliveries.

Bituminous quotations at wholesale, f.o.b. loading ports at points designated, are about as follows, per gross ton:

	Clearfields	Camb. & Som's't	Geo'gs. Creek*
Philad'la...	$2.60@3.20	$2.90@3.45	$3.07@3.17
New York..	2.90@3.50	3.20@3.75	3.37@3.47
Baltimore..	.....	.....	3.00@3.10
F.o.b. mines	1.35@2.00	1.65@2.25	2.00@2.10

*On contract.

Pocahontas and New River are quoted at $4, f.o.b. Norfolk and Newport News, Va. On cars Boston and Providence, the range for the same coals is $6.50@6.75.

Anthracite—Shipments get slower and slower. All the companies are falling way behind on what their sales departments were expecting to accomplish. Added to the slow movement of boats the scarcity of some of the domestic sizes is causing dealers here a lot of worry. So far several cargoes have been allowed to go forward with what kinds and sizes happened to be on the dock when the barge arrived, but, of course, there will be a limit to the volume of chestnut and pea that dealers can take; that is, unless a big coal famine is coming. Broken coal is being taken for engine fuel and egg is still the size in shortest supply. At New York stove coal is very scarce. The larger dealers here are arranging for outside transportation to load, and there is canvassing to secure independent coal.

PHILADELPHIA

Anthracite settles down after strike rush. Good orders in hand and shipments slow. Retailers busy, but hampered by short labor supply. Shortage of fuel predicted for this winter. Bituminous short, with further price increases.

Anthracite—The market seems quiet and peaceful after the turmoil earlier in the month, when everyone was in fear of a railroad strike. However, business has now rounded too in good shape and with a steady run of orders it is easier to handle than when the demand for immediate shipments of all sizes was unanimous. The dealers are beginning to realize that the predictions made by the shippers that coal will be scarce this winter are well founded. Even at this time shipments are not at all prompt, and the dealers are making every effort to be prepared for the demands that will be made upon them when the first cool spell arrives.

The retail branch of the trade is comfortably busy working on the numerous orders that came in when the strike seemed imminent. These were orders that would not ordinarily have been received for a month or six weeks. Yet with the scarcity of help necessary to run their yards, the dealers are not soliciting new business with the same aggressiveness of other years. They are anxious to fill every order possible now so that their later responsibilities may be less, but even now they can make but slow progress. They find their forces changing overnight, as many of the men willing to do this class of labor are content to work only four or five days a week. The demand on the shippers would soon be more insistent if the deliveries to the consumer could be made more rapidly.

Another smaller operator recently made the statement that this winter would be a seller's market and that he proposes to dispose of his product at the highest prices obtainable. When reminded he might ruin his business he showed little concern and stated that he has really little control over his customers, as they often leave him for an advantage of 10c. to 20c. a ton, yet are eager to seek his protection during a scarcity. With this state of affairs existing all the big companies who have coal in storage are showing no anxiety whatever. In fact one of them has recently been pricing up chestnut coal for consignment to the Western market. This is the only one of the family sizes that has been at all troublesome in this market all summer.

Broken coal continues strong, with the contractors calling for their full quota for manufacturing purposes. There is also quite an active demand for transient business and the retail men who have a demand on them from small foundries for a few cars a year are finding much difficulty to have their calls filled.

Egg coal shows no weakness, although heavy consignments were recently made to the local market.

Stove remains the leader with no noticeable decrease in the demand, although the retailers predict a falling off in the course of a month or so, stating that such has always been their experience on this size.

The improvement noted last week on chestnut goes steadily on.

The pea production is being quickly absorbed without any of the big companies finding it necessary to send any of this size to their storage yards.

The demand for buckwheat continues very active and those concerns who have not tied up their output at the contract price of $1.55 find no difficulty at all in getting $1.60, and in some instances $1.65.

The other steam sizes are in fair demand, but not so active as just before the threatened strike. There is no doubt that these sizes will greatly improve as the season advances, due to the rising bituminous market.

Collections are showing noticeable improvement, as those dealers who have the habit of taking a month or so extra are beginning to find that it is advisable to pay their bills in accordance with the shippers' terms. The impression is growing that recent slow shipments to them were perhaps due to other causes than shortage of coal.

The prices per gross ton f.o.b. cars at mines for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken..	$3.60	$4.75	Buck....	$1.65	$2.55
Egg.....	4.15	5.25	Rice.....	1.00	1.90
Stove...	4.40	5.60	Boiler...	.90	1.80
Nut.....	4.50	5.55	Barley...	.75	1.65
Pea.....	2.80	3.70			

Bituminous—There is certainly no dearth of orders, but the great difficulty is to fill them. At the present time it is far easier to sell coal than to deliver it, and the greatest hindrance to prompt delivery at this time seems to be the sudden shortage of cars at the mines in the South. Prices advanced considerably the last few days and many consumers realizing that low prices are gone for a long season are hurrying to become protected. Nevertheless most shippers are refusing to enter into any price agreements and all quotations are being made for immediate acceptance.

The market is practically free of spot coal and there is therefore a minimum of trading of this kind. The railroads are also in the market for coal of almost any kind and have sent buyers right into the regions to close business, a proceeding quite unusual for them. Due to the small shipments arriving most of the trading is being done between brokerage houses, as any number of shippers have been caught with commitments that they are unable to fill.

The prices per gross ton f.o.b. cars at mines are fairly well represented by the following list:

Georges Creek Big Vein	$2.00@2.10
South Fork Miller Vein	2.00@2.15
Clearfield (ordinary)	1.75@1.85
Somerset (ordinary)	1.75@1.85
West Va. Freeport	1.85@1.75
Fairmont gas	1.75@1.80
Fairmont gas, mine-run	1.55@1.65
Fairmont gas, slack	1.40@1.55
Fairmont lump, ordinary	1.60@1.70
Fairmont mine-run	1.45@1.55
Fairmont slack	1.40@1.50

BALTIMORE

Market drops from panic prices but is still firm at good figures. Trading less active. Anthracite men have trouble in inducing late summer purchasing.

Bituminous—The market went down after the big flurry of the strike-fear period, when it had reached as high as $3.50 mine basis at tide for spot coals. But the period of recession has not taken prices back to where they were before the boom period. Despite the fact that there is now but a light ordering and few large inquiries the producers are holding firm. It is expected that this condition will continue until the fall demand for coal starts which will tighten up the market considerably and make all talk of a backward movement of prices out of the question. Quotations to the trade on mine basis are about as follows:

Georges Creek Tyson, $2@2.25; South Fork, $2; Somerset, $1.80; Clearfield, $1.80; Latrobe, $1.75; Quemahoning, $2; Freeport, $1.65; Fairmont gas three-quarter, $1.60; same, run-mine, $1.40; same, slack, $1.30.

Anthracite—The hard-coal dealers are busy rounding up deliveries on the last of their summer orders, and are endeavoring to make belated customers place their business before the fall business sets in in earnest. It is always difficult to get such late purchasers, who have now been cut off from anything except fall rates, to get under cover. This year there seems to have been more than the usual number who failed to place summer orders. This should make a healthy fall and winter business, but the coal men want to get some of it out of the way.

Exports—Exports took a slump the past week. There were but three loadings noted, for a total of 9,102 tons. The coal carriers also took 1,448 tons for bunker use.

NEW YORK

Heavy call for anthracite continues. Some shippers take orders subject to delay. Much activity in bituminous market. Production slow, due to short labor and car supply.

Anthracite—Tidewater shippers are much interested in the tonnage figures for August, which show a decrease of about 11,063 tons at Tidewater shipping ports. Much of this decrease is attributed to heavy Western shipments.

Production so far this month has been greatly interrupted by labor disturbances in the upper coal fields and many of the mines are said to be operating about 50% short of help.

Call for domestic coals continues heavy. Egg and stove remain particularly short, some shippers taking orders for the first subject to 6 weeks' delay, and for the last-named size subject to 3 weeks' delay. New England is particularly short of both coals and many hurry-up requests for shipments are received here. Chestnut coal is in much better demand and considerable of this grade is being sent to Western points. An occasional lot is sold at 10c. below circular. Pea coal is becoming stronger; good grades were sold early this week at 10c. below full price, while some of the cheaper coals are bringing from 10 to 15c. less.

The steam-coal situation is likely to become serious as the season advances. All sizes are tighter and premiums of 50c. would not be surprising within the next few weeks. Buckwheat No. 1 is in good demand; it is the easiest of three coals and is bringing full circular. Nos. 2 and 3 are scarce and certain shippers from the upper ports are refusing orders for them. It is pointed out that the increased demand following the starting up of heating plants in the big office buildings and factories will cause a decided shortage in these coals. Boiler coal continues to be made by some operators.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	4.95	
Egg	5.45	5.45@5.55
Stove	5.70	5.70@5.80
Nut	5.75	5.75
Pea	4.00	3.75@4.00
Buck	2.75	2.65@2.75
Rice	2.20	2.15@2.20
Barley	1.95	1.85@1.95
Boiler	2.20	.....

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The bituminous market continues to show much activity. Demand is heavy and prices are strong. There is comparatively little coal at Tidewater outside of what is actually under contract. A heavy call for supplies continues from the Sound and New England, but shippers find it difficult to obtain boats on favorable terms. Rates in the harbor are unusually high for this season, ranging early in the week from 30 to 40c.

Although there was a considerable falling off in prices following the settlement of the railroad labor trouble, present quotations are as a rule about 25c. above what they were previously.

Reports from the mines show greatly curtailed production. Labor is scarce while much complaint is heard of poor car supply, especially along the Pennsylvania road. Some operators are getting about 50 per cent. of their actual needs while the demand for coal is heavy from the entire Eastern section of the country. All rail shipments to New England have increased and coal is now moving freely from central Pennsylvania into that section. Box cars for Western shipments are especially scarce. Water shipments are somewhat restricted, owing to the high water rates, though considerable coal is being sent forward.

Locally, the situation is encouraging to the trade. Stocks of dealers and large consumers are getting low, and efforts are being made to fill up. Coal is, however, scarce and some contract holders are hunting the market for odds and ends. The lowest quotation heard the first of the week was $3.10.

Bunkering calls for a heavy tonnage, while many inquiries continue to be received for export coal.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades follow:

	Port Reading	St. George	Mine Price
George Crk.			
Big Vein.	$3.50@3.75	$3.50@3.75	$1.95@2.20
Tyson...	3.30@3.50	3.30@3.50	1.75@1.95
Clearfield...	3.25@3.40	.....	1.70@1.85
South Frk..	.....	.....	1.95@2.00
Nanty Glo.	.....	.....	1.85@1.95
Som'r. Co..	3.15@3.30	3.15@3.30	1.60@1.85
Que'ho'ing.	3.20@3.30	3.20@3.30	1.65@1.85
W. V. Fa'rm't			
Th'r'qua.	3.25@3.30	3.25@3.30	1.45@1.50
Mine-run	3.20@3.25	3.20@3.25	1.40@1.45
West. Md...	2.95@3.10	2.95@3.10	1.40@1.55

HAMPTON ROADS

Heavy demand and shipments light. Congestion of vessels causes delay in loading. Stocks meager. Prices firm.

There seems to be no falling off in the demand for coal of all descriptions. Full allowances are being taken under contract and new business is offering freely. All shippers are hard put to meet their requirements, as consignments from the mines are coming forward in most unsatisfactory volume; this condition is largely due to the temporary disorganization of transportation incident to the threatened railway strike.

On account of poor receipts dumpings for the first week of September are below normal. There is heavy congestion of shipping, delayed on account slow loading, but this condition will be rapidly overcome if receipts improve. Stocks are very light on all of the three Hampton Roads terminals and the coal in transit from the mines is also much below normal.

Coastwise freights remain firm around $2 for the larger carriers. Foreign freights, particularly to the Plate and Brazil, show a slight falling off. A considerable tonnage is carried to South America by foreign sailing vessels, the rate for this class of tonnage being somewhat less than for steamers.

Shipments to Cuba were unusually heavy the past week, eight cargoes being reported shipped. The tug "W. S. Taylor," recently sent from Norfolk to take bunker coal to the Norwegian steamer "Bjornstjerne Bjornsen," being held at Bermuda on account of being unable to obtain bunker coal, has returned and the steamer arrived the same day. The steamer was unable to get any bunkers at Bermuda on account of being on the British blacklist.

Prices are firm as follows: Pocahontas and New River, for cargo, $3.50@4 per gross ton; for bunker delivery, $3.75@4 per gross ton plus 10c. trimming. On track, for local consumption, $3.50@3.75 per net ton. Anthracite, $7.50 per net ton delivered. The high volatile coals are also in good demand and are selling at excellent prices.

Railroad Tonnages—The following is a comparative statement of the tonnages handled by the different roads for the weeks ended Sept. 9, 1915-16, and for the first 11 weeks of the last half of the years:

	Week 1915	Week 1916	11 Weeks 1915	11 Weeks 1916
Nor. & West.	156,459	175,875	2,032,142	1,794,441
Ches. & Ohio.	93,260	107,989	1,060,896	1,077,989
Virginian.....	70,855	71,330	750,377	949,586
Total.....	320,574	355,194	3,843,415	3,822,016

Ocean Shipping

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Atlantic	Marseilles	3,348	
Mar Mediterraneo	Spain	1,657	
E. A. Danenhower	St. Johns, N. B.	500	

BALTIMORE

B. P. Pendleton	Barcelona	321	$32.00

VIRGINIA

E. M. Willey	Azores	735	7.00
Theoline	Porto Rico	850	7.00
M. M. Ford	San Domingo	291	
	Rio Janeiro d.w.	8,000	12.50
Majdari	Rio Janeiro		14.40
Vanlear Black	Bahia	548	
Oregonian	Rio Janeiro	3,651	12.50
Monkshaven	River Plata	2,097	14.40
Cento	River Plata	2,393	13.80
Henrik Lund	Rio Janeiro	2,641	14.00
Harald	Havana	1,921	
	Campana, Las Palmas or Zarate d.w.	3,000	13.20
Kim	River Plate	3,342	13.20
Carnmoney	River Plate	1,255	13.00
Major Pickands	Barcelona	1,873	
(British Str.)	River Plate	4,800	15.00
Margarita	River Plate	1,504	12.00
Theoline	Porto Rico	85	7.00

PERTH AMBOY

Dorothy	Halifax	758	3.25

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

Vessel	Destination	Tons
Achilles[6]	Cristobal, C.Z.	12,000
Exford[7]	Montevideo, Uruguay	7,326
Tordenskjold[5]	Barbados, B.W.I.	5,459
Mossamedes[3]	Lisbon, Portugal	3,796
Aurania[1]	Genoa, Italy	5,380
Panama Transport[4]	Havana, Cuba	7,409
Rota[2]	Buenos Aires, A.R.	3,150
Bertha[6]	Havana, Cuba	1,369
Mincio[1]	Genoa, Italy	2,545
Berwind[4]	San Juan, P.R.	2,951
Harald[4]	Havana, Cuba	4,640
Campania[1]	Civita Vecchia, Italy	6,133
Fallodon[3]	Buenos Aires, A.R.	3,880
San Rossore[1]	Spezia, Italy	5,308
Wm.M.Critchett[3]	St. Georges, Bermuda	834
Giulio Cesare[1]	Italy—Any port	5,032
Oregonian[3]	Rio de Janeiro, Brazil	7,374
Rio Pirahy[1]	Leghorn, Italy	5,166
Daiten Maru[1]	Spezia, Italy	4,500
Dorothy[5]	Piraeus, Greece	5,775
Michail Ontchoukoff[3]	Campana, A.R.	3,046
Brookwood[5]	Buenos Aires, A.R.	3,485
Majoren[5]	Rio de Janeiro, Brazil	2,762
Carlos[13]	Mejillones, Chile	3,391

NEWPORT NEWS

Iverna[2]	Bahia, Brazil	3,631
Brookwood[5]	Buenos Aires, A.R	679
Swanley[2]	Rio de Janeiro, Brazil	5,855
Bratland[2]	Cienfuegos, Cuba	2,930
Henrik Lund[2]	Rio de Janeiro, Brazil	6,008
Florentino[10]	Taltal, Chile	5,189
Belita[2]	Santiago, Cuba	813
Jas. M. W. Hall[11]	Las Palmas, G.C.I.	755
Catherine Cuneo[2]	Santiago, Cuba	1,206
Mary Olsen[2]	Neuvitas, Cuba	928
Trongate[12]	Frey Bentos, Uruguay	3,268
Malm[2]	Sagua, Cuba	1,725

BALTIMORE

Almoro	Chile	2,013
Honduras	Columbia	408
Santa Cecelia	Brazil	6,681

PHILADELPHIA

Runa	Puerto Padre	
Josey	Havana	
Wein	Antilla	
Elswick Park	Santos	
R. B. White	Ponce, P. R.	
Mar Mediterraneo	Tarragona	1,657
Munorway	Havana	

[1] Pocahontas Fuel Co. [2] Berwind-White Co. [3] Castner Curran & Bullit. [4] Baker-Whiteley Co. [5] Smokeless Fuel Co. [6] W. C. Atwater & Co. [7] Houston Coal Co. [8] New River Coal Co. [9] C. & O. Coal & Coke Co. [10] C. H. Sprague & Son. [11] West Virginia Coal Co. [12] C. & O. Coal Agency Co. [13] Northern Coal Co.

COASTWISE FREIGHTS

The demand for boats from Hampton Roads to Boston is perceptibly weaker on account of the scarcity of coal to load. Charterers prefer not to risk detention at the piers until the prospect is somewhat clearer. As a result two or three large sailing vessels lately returned from off-shore and several barges are at Norfolk waiting charter. Two dollars is therefore only a nominal rate, for less would probably be accepted. One dollar and seventy-five cents has been quoted from Hampton Roads to Providence, which is 10c. less than a week ago. For Philadelphia loading $1.50 is asked to Long Island Sound ports and from New York, rates are strong at $1.20@1.30. Small coasters are still firm at $2.50 from New York to Penobscot Bay points. A shortage of boats is the rule at New York.

OCEAN FREIGHTS

Very few steamers were chartered for export coal during the past week, and the only fixture of interest was the reported charter of the British steamer "Cento," 6,000 tons, 10 per cent., from Virginia to Buenos Aires, October loading, at $13.80.

We would quote freight rates on coal by steamer little changed as follows:

	Sept. 5	Sept. 11
West Coast Italy....	$26.40@28.80	$27.60@28.80
Marseille.....	25.20 about	25.20
Barcelona*[2].....	21.60@24.00	21.60@24.00
Montevideo.....	14.40 about	14.40
Buenos Aires.....	14.40 about	14.40
Rosario.....	15.60 about	15.60 about
Rio Janeiro.....	12.50 about	12.25
Santos.....	13.00 about	12.75
Chile (good port)....	9.00@10.00	9.00@10.00
Havana.....	3.75@ 4.00	4.00 about
Cardenas, Sagua....	5.00@ 5.50	5.00 about
Cienfuegos.....	5.25 about	4.50@ 5.00
Port au Spain.....	5.75@ 6.00	6.00 about
St. Lucia.....	5.75@ 6.00	6.00 about
St. Thomas.....	5.25@ 5.50	5.50 about
Barbados.....	5.75@ 6.00	6.00 about
Kingston.....	5.00@ 5.50	4.50@ 5.00
Curacao[1].....	5.00@ 5.25	5.25 about
Santiago.....	5.00@ 5.50	4.50@ 5.00
Guantanamo.....	5.00@ 5.50	4.50@ 5.00
Bermuda.....	4.25@ 4.50	4.00 about
Vera Cruz.....	5.50@ 5.75	6.00@ 6.50
Tampico.....	5.50@ 5.75	6.00@ 6.50

*Spanish dues for account of cargo. [1]And p.c. [2]Or other good Spanish port.

Note. Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battle & Co.'s Coal Trade Freight Report.

Lake Markets

PITTSBURGH

Demand good. Car shortage pronounced and labor supply scant. Gas slack in particular demand.

The coal market has pursued rather an uneventful course the past week, following the restoration of normal conditions after the railway strike was averted. There has been a good demand for coal from all sources and the chief point has been to maintain production. Car supplies have continued poor, on the whole poorer than three or four weeks ago, while labor shortage is reported at many mines.

Youghiogheny gas slack has stiffened further, and readily brings $1.40 for the best grades. Ordinary steam slack is still available in limited tonnages, chiefly from the Pan Handle district, at $1.10, and there are various intermediate prices. A distinct shortage of slack is generally predicted for this winter and a great deal of mine-run will probably be crushed. Operators are accumulating scarcely any stocks, the current demand being so heavy. It is only a few years ago that large accumulations were the rule for the summer, but the consumption of slack for steam raising has greatly increased and there has not been a corresponding increase in the production, by the shipment of Lake coal. We quote: Slack, $1.10@1.40; mine-run, $1.50@1.60; ¾-in., $1.60@1.70; 1¼-in., $1.70@1.80, per net ton at mine, Pittsburgh district.

BUFFALO

Shippers predicting a further advance in bituminous. Some consumers finding their delay in buying was a mistake. Anthracite beginning to move.

Bituminous—Shippers are finding the difficulty of getting orders filled at the mines growing steadily worse. Some of them have about given up asking for coal on single orders and are merely trying to keep up with their contracts. They are positive that the consumers are making a mistake in not buying more liberally and some consumers now agree with them. It is too late now, though, to rectify the mistake, for as soon as the consumers enter the market, prices will go up. The conditions of labor and the car supply, added to the increased consumption when cool weather sets in, can hardly fail to advance prices.

Reports agree that the situation is tightening up on all sides. The Lake shipments of bituminous are so far behind the average that rates are up to $1 for most Lake Michigan ports, with all the fall storms yet to come. Lake vessels prefer down freights to coal at any price. Consumption in the factories and iron mills continues heavy.

All bituminous prices are strong. Sellers of Ohio No. 8 and other Panhandle coal are now

asking for best grades nearly as much as is paid for Pittsburgh coal. Quotations remain as before, but with greater strength to three-quarter and slack, as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$3.00
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.80
Slack	2.40	2.30	2.80

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—There is not much stir yet in the city market and it will be quiet till cool weather sets in, but the Western demand is much heavier than it was through the summer. The rail lines are taxed to furnish cars enough to meet the requirement and the Lake shippers would load more coal if they could get it. As a rule they are far behind last year's figures and are unable to keep from going further behind every month. The prospect is of going into winter close to a million tons behind last season.

The shipments by Lake for the week were 83,700 net tons, of which 13,200 tons cleared for Chicago, 18,800 tons for Sheboygan, 4,200 tons for Manitowoc, 4,100 tons for Racine, 3,300 tons for Kenosha, 1,000 tons for Green Bay and 39,100 tons for Duluth and Superior.

Prices of anthracite are strong, but there is as yet no premium paid for independent coal. Following is the September circular, per gross ton, f.o.b., without discount:

Grate	$5.85	Chestnut	$6.35
Stove	6.10	Pea	5.00
Egg	6.10	Buckwheat	3.50

A charge of 25c. additional is made for loading on Lake vessels.

TORONTO, CAN.

Trade steady. Orders for anthracite behind in delivery. Increase in price revives demand for municipal coal yards. Bituminous stocks light.

Trade is steady, anthracite moving more freely than bituminous. Large orders for the former had been placed by consumers in anticipation of the increase of 50c. per ton, which went into effect Sept. 1, and dealers are considerably behind in their deliveries. The increase is regarded by many as unwarranted, but is defended by dealers as due not merely to an advance in price at the mines, but to higher wages to drivers, who are agitating for a further increase.

Deliveries by rail are still retarded by car and labor shortage and stocks of bituminous on hand are comparatively light. Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove and nut, $8.50; grate, $8.25; pea, $7.50; bituminous steam, $5.25; screenings, $4.50; domestic lump, $6; cannel, $8. Wholesale f.o.b. cars at destination, bituminous three-quarter lump, $4.35; screenings, $3.45; Pennsylvania smokeless lump, $4.50; Pocahontas lump, $5.75; slack, $4.50.

COLUMBUS

Continued strength is the chief feature of the trade. Stocks light and buying urgent.

Demand for all grades has been good and there is no cutting of the circular. With the car shortage becoming more pronounced and the demand increasing, it is believed that the market will show considerable strength during the next month or six weeks. The tone is good and future prospects are excellent.

Domestic demand is the best feature of the trade at this time. Dealers are buying well, both for immediate shipment and for delivery the latter part of the month. In fact, stocks in the hands of retailers are not large and they are making strong efforts to cover. Retail prices are firm at the advanced list, announced the first of the month. Pocahontas is still in good demand and the same is true of West Virginia splints. Hocking lump is now moving in large quantities and dealers are gradually stocking Ohio coal. Anthracite is strong and prices are at a premium. The scarcity of labor in the yards has made it difficult to get cars unloaded promptly.

Lake trade is still active and every effort is being made to rush a large tonnage to the Northwest. Reports show a shortage of almost 2,000,000 tons. Little congestion on the docks of the upper Lake ports has occurred because of the steady movement to the interior. Lake boats are scarce and chartering is attended with difficulties.

Prices on short tons, f.o.b. mines, are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$1.75	$2.00	.....
Inch and a quarter	1.65	1.85	$1.65
Three-quarter inch	1.55	1.75	1.45
Nut	1.40	1.50	1.35
Egg	1.40	1.45	.....
Mine run	1.35	1.40	1.30
Nut, pea and slack	1.10	1.15	1.05
Coarse slack	1.00	1.05	.95

CLEVELAND

Large supply on track. Prices lower on account of railroad strike being averted. Coarse coal for spot shipment scarce and prices firm.

A great deal of coal was on track every day this week, most of which had been shipped with hopes that it would reach the Cleveland market before the railroad strike was called, but as it did not arrive until the strike was averted, the coal went begging, slack taking the sharpest drop, selling around $1.90 to $2 f.o.b. Cleveland.

The Lake demand is holding the price of coarse coal up to $1.35 for three-quarter f.o.b. the mines; this is the first week this season that the operators have been able to secure this figure for three-quarter coal for spot shipment. There is a very good demand for Lake coal at all points, which is the main factor in boosting coarse-coal prices.

Shipments of hard coal to Lake Superior in August did not equal the July movement of 366,900 tons, but bituminous-coal shipments passing through the waterways, amounting to 2,424,911 tons, show a gain of 63,969 tons over July's total.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack
No. 8	$2.25	$2.15	$2.05
Cambridge	2.25	2.15	2.05
Middle Dist	2.15	2.05	1.95
Hocking	....	....	1.95
Youghiogheny	2.60	2.50	.....
Pittsburgh	2.60	2.50	.....
Pocahontas	.....	3.05	.....

DETROIT

Steam-coal users buy only for current needs. Orders for domestic stock come in slowly. High rates mark Lake shipments.

Bituminous—Relieved of the necessity for taking precautions against a suspension of transportation facilities, most of the Detroit consumers are again buying in small quantities. Frequent renewal of orders makes a steady business, but the volume of sales is not what the wholesale dealers had expected, in view of the probable difficulty an impending car shortage might create. With freight charge included, slack from West Virginia mines is selling at about $2.90 and from Ohio fields at around $2.75 to $2.85. West Virginia mine-run commands about $2.85 and three-quarter lump from Ohio or West Virginia mines about $2.90. Smokeless stock is in good demand, though the supply is rather limited, owing to heavy shipments eastward.

Anthracite—Some delay is experienced in getting delivery, especially on orders for stove coal. Lack of car supply also is reported. Retail dealers are buying mostly in small quantities and consumers are beginning to show a disposition to place orders for winter needs. Most of the retail yards have adopted the advance to $8.75 on chestnut and $8.50 on egg and stove sizes, which were announced by several of the dealers as effective Sept. 1.

Lake Trade—Shortage of railroad equipment is being made apparent in a slower movement of coal from the bituminous fields to loading docks, this resulting in a number of carriers having been sent on the upbound trip without cargoes. With vessel capacity scarce, the shippers are bidding high for the tonnage, particularly for cargoes to Lake Michigan ports. A small ship was chartered recently at $1 a ton on hard coal from Erie to Chicago and the contract was made only because the owner of the vessel saw an opportunity to load a grain cargo in Chicago for the return trip. On cargoes for the Canadian head of Lake Superior, the rate is 50c. and an equal amount is paid on shipments for Ashland, Wis., and Portage, while to Marquette 45c. is obtained. Distribution of coal from docks in Duluth and Superior is reported proceeding in unusual volume and shipments to the interior in August were 245,455 tons greater than during the same month of 1915.

LOUISVILLE

Car shortage, on one-third supply basis, seriously affecting Kentucky coal fields. Railroads promise no relief. Prices soar and industrial consumers fear famine.

Both eastern and western Kentucky coal fields are seriously affected by the car shortages. Operators in each section state that a two-day-a-week supply is all they can depend on, and the Louisville & Nashville Railroad Co. holds out no hope for relief until spring.

Prices are in rather a chaotic state and some grades and sizes are not to be had at any price. Four-inch block in eastern Kentucky is as high as $2.25; 2-in. up to $2.10; 2x4-in. egg is listed $1.75; mine-run $1.50, with few selling it, while nut and slack is up to $1.10@1.25 and virtually none to be had, except as contracted for. The western Kentucky situation is relatively the same, with no slack on the market and lump at $1.25@1.35. Some of the larger companies, the St. Bernard Coal Co. for instance, report that their Louisville yards are almost bare of domestic sizes.

CINCINNATI

Market strong and active. Cooler weather increasing the demand. Mines working to capacity.

The threatened railroad strike has had the effect of waking up the public to the fact that the fuel stocks are very low, and buying since the holiday has been heavier than at any time this season. While the demand continues the heaviest on the steam grades, the domestic market has also shown the greatest activity of the season, and dealers are beginning to make up the deficit in their supplies. Stocks are unusually low, and as consumers are beginning to call for deliveries of winter stocks the domestic market should develop considerable strength from now on.

Conditions at the West Virginia mines not affected by the recent floods are better than for some time, as they have benefited from the use of the labor and cars released by the other mines being closed down. Operators whose mines were damaged by the floods are bending every effort to get things in shape to resume work. Prices are steady and advances are freely predicted.

BIRMINGHAM

Steam-coal market very strong, with domestic grades showing improvement. Car shortage serious factor and greatly hindering the production and movement.

All grades of steam coal are in active demand and the market continues to improve and prices stiffen. A number of operators are sold a month ahead on their steam product, the first time this has been the case in quite a while, and the spot buyer has some difficulty in providing for his requirements. Blacksmith and domestic grades are also in healthy demand. It is reported that most all the smaller commercial operators are now sold up for some time to come.

We quote prices on some of the most active brands of steam coal, per net ton, f.o.b. mines, as follows:

Pratt mine-run	$1.30
Big Seam mine-run	1.10
Big Seam washed	1.20
Cahaba mine-run, washed	1.50
Yolande lump	1.40
Yolande washed nut	1.50@1.60
Jagger ½x3½-in. nut	1.00
Blacksmith	2.00@2.25

Coke

CONNELLSVILLE

Heavy shipments of Connellsville coal for by-product coking. Coke strong though quiet. Production remains at about 400,000 tons weekly.

The steady increase in recent months in the shipment of Connellsville coal for byproduct coking is the dominant factor in making the coke market at present. The coal shipments are running 225,000 to 275,000 tons per week from the Connellsville and lower Connellsville regions, chiefly the latter, representing coal that would make say 170,000 tons of coke a week if coked in the region. While the coke shipments of about 400,000 tons a week are 50,000 tons less than the region did some years ago, the total volume of Connellsville coal mined is vastly larger than ever before in the region's history. While the supply of labor is insufficient it is obviously greater, in the aggregate, than before.

The Connellsville operators expect to secure such good prices for their coal in the future that it would not be profitable to sell coke at much below today's prices. The bulk of the coal now being shipped is against contracts made at much lower prices than are now expected for the future.

There is only a very moderate demand for prompt furnace coke but the offerings are extremely limited. Operators are talking with more confidence as to their securing $2.75 on first-half contracts, but as yet there is no active inquiry. We quote: Spot furnace, $2.80@2.90; contract, nominal, $2.50@2.75; spot furnace, $3.25@3.50; contract, $3.25@3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 2 at 401,110 tons, an increase of 3,615 tons, and shipments at 403,984 tons, an increase of 5,015 tons.

Buffalo—The market is strong, with orders often hard to fill, as the demand continues active and there is no increase in the supply of men. Recent increased competition from newly established byproduct ovens has not affected the situation materially. Shippers quote best 72-hr. Connellsville foundry at $5.25, 48-hr. furnace at $5, high sulphur at $4.40 and stock at $4.25.

Chicago—Coke demand has been heavy, with all prices very strong. Car shortage is interfering with deliveries to some extent. Serious trouble is expected later, due to tightening up of shipping facilities. Nominal prices per net ton, f.o.b. cars Chicago, are as follows: Connellsville, $6 to $6.25; Wise County, $6 to $6.25; byproduct foundry, $6 to $6.25; byproduct domestic, $5 to $5.50; gas house, $4.75 to $4.85.

Birmingham—Both furnace and foundry coke continue in active demand, with very little of either grade available for the spot market, practically the entire production of the district being required for furnace operations and contract requirements for foundry consumption. Quotations are $3.25@3.50 on furnace coke and $4.25@4.50 on foundry product, spot buyers being able to secure a few cars now and then at top-notch prices.

Middle Western

GENERAL REVIEW

Prices well maintained. No surplus tonnage in any quarter. Steam coals very strong. Domestic absorption quite heavy.

The market is strong in every respect While the tension and wild clamor for coal incident to the threatened railroad strike is past, prices are easily maintained at schedules and some premiums have been paid for storage coal this week. The factors which have been making for strong business still prevail, and inasmuch as colder weather is near it is felt that no reaction of any consequence is likely.

Screenings are especially strong, contrary to the usual state of affairs existing at this time of year. Domestic lump is absorbed as fast as produced, while coarse steam sizes and washed coal are sold well ahead. Unbilled coal at Western mines is nil. Steam coals during the recent strike flurry reached prices 60c. to 75c per ton above the regular September schedules, and have not yet dropped back to the normal stage. Shippers as a rule have displayed a policy of taking care of their regular customers under contract without penalties.

The trend of Western prices is undeniably higher, and will be governed largely by car supply and weather conditions. From present appearances any normal shortage of coal cars with the usual fall weather will quickly bring prices back to where they were during the threatened railroad strike, when large premiums were exacted. The retail trade during the recent flurry became rather panicky and flooded the mines with orders for any kind of coal in any kind of equipment and at any price, fulfilling the predictions of several months past that retailers have been short of normal stocks

Contract Lake shipments are moving as freely as car supply will permit. Producers of Lake coal are making every effort to maintain shipments at the maximum, hoping in some measure to alleviate a situation that is bound to become acute sooner or later. Complaints are being made that the movement of coal from Western mines is very slow, and congestion at some of the larger centers of traffic said to be responsible for delays.

Some of the anthracite agencies predict a shortage of coal very soon, which may cause prices to increase considerably. Anthracite representatives here refuse to quote except for immediate delivery, and anticipate an advance in the latter part of the month of about 25c. per ton.

Smokeless coals are generally short in Western markets. No figures are obtainable as to tonnage shipped from Lake Superior dock points during August, but it is understood that the tonnage is the largest ever moved in one month. Illinois shipments were also very heavy and exceeded any other month on record.

ST. LOUIS

Buyers again in the market and the trade is firm. Indications of a runaway market. Kansas strike affects the situation.

After the big flurry in prices last week, everything was very quiet Saturday, buyers holding off waiting developments. This gave the market an appearance of weakness and some seemed to feel that a reaction would set in. However, operators knew their position was strong as cars were short and seasonable demand outrunning supply, and felt that after prices were once established on a high level, there was no reason why they should not be maintained. All operators had good orders on their books and as soon as the buyers found that prices were up to stay they were forced back in the market and the week wound up with very active buying on all grades of coal.

It begins to look as if a runaway market is inevitable. The seasonable domestic buying is bound to be unusually heavy, owing to the fact that little coal moved during the summer and this tonnage has to be made up. Fifty per cent. is a liberal estimate of the present car supply and it is steadily getting worse. During the railroad-strike scare the roads took large quantities of extra coal, which is tying up thousands of cars loaded with company coal. This makes the acute car shortage even worse.

The industrial demand is extremely heavy as all factories are running overtime and general business has never been better. In addition to all this, the Southwestern districts in Kansas and Oklahoma went out on a strike that looks very stubborn and the southwestern railroads are coming to the St. Louis market for coal and snapping up everything in sight on the open market.

Franklin County operators will accept business only upon the basis that the price at time of shipment is to govern. This means probably $2 or $2.25 at the mines. They are sold up on lump for the balance of the month and on other sizes for two weeks.

Williamson County producers are practically sold out for the better part of the month and the same is true of the Staunton and Springfield districts.

The Standard district is sold out for a week or so ahead and it is in this district, which has been selling cheap coal, that the biggest advances will be made.

There has been a tremendous rush of anthracite orders. All rail anthracite is impossible to get and orders for it are being refused by the wholesale. At the rate things are going even the docks will be short of coal very shortly.

The market is quotable on the following basis per net ton, f.o.b. mines:

	Williamson	Staunton	Intermediate	Standard
6-in. lump	$1.80	$1.75	$1.75	$1.35
6x3-in. egg	1.80	1.75	1.75	1.20
3x2-in. nut	1.80	1.75	1.75	1.10
No. 2 nut	1.50	1.30	1.35	1.00
No. 3 nut	.....	.....	.....	.....
No. 4 nut	.....	.....	.....	.....
No. 5 nut	.....	.....	.....	.....
Screenings	1.00	1.00	.90	.85
2-in. lump	.....	1.40	1.25	1.20
Steam egg	.....	.....	.....	.....
Mine-run	1.25	1.25	1.20	1.05
Washed	.....	.....	.....	.....
No. 1 nut	1.80	1.75	1.75	1.60
No. 2 nut	1.65	1.50	1.50	1.50
No. 3 nut	1.40	1.30	1.30	1.25
No. 4 pea	1.30	1.25	1.25	1.20
No. 5 slack	.90	.90	.85	.80

CHICAGO

Stiff prices prevail for Indiana and Illinois coals with demand active. Smokeless short. Anthracite firm.

Most Franklin County mines are sold up for September shipment, car supply being about 65% of normal. Domestic lump has sold as high as $2 during the week. Screenings are firm at from $1 to $1.10 per ton. The outlook for business at Williamson County mines is most satisfactory, and they are taking no further orders for lump and egg for September delivery at less than $2. Steam washed coal has been selling as high as $1.25. Saline County lump is also very strong, with egg coal somewhat more abundant at around $1.90. Most all southern Illinois operators have withdrawn their salesmen from the country districts, not wishing to actively solicit business under present circumstances.

The closing down of Kansas mines will undoubtedly cause a heavy demand for screenings from central Illinois mines to supply Kansas City and adjoining territory, which will have a tendency to cause higher prices on spot screenings from this district. Lump shipments have shown quite an expansion; car supply has been fairly adequate. Egg size is slower in movement than the others. Screenings have been averaging around $1.

Scarcity of cars and delays in movement are complained of by the Indiana operators. Reports are current that prices on all sizes of Indiana coal will be advanced shortly. Steam coals from the Nos. 5 and 6 veins have been moving very freely at high prices. Knox County operators have had no open tonnage for sale, contracts absorbing the entire output. Sullivan and Linton County mines report increased calls for domestic sizes from Chicago and adjoining territory.

The smokeless situation is unsatisfactory from the retailers' point of view on account of short supply. Spot mine-run has been selling as high as $1.75; lump and egg is quoted nominally at $2, but free shipments of prepared sizes readily bring $2.25 to $2.35. Such shipments of Pennsylvania smokeless as reach this territory are being applied to contracts.

All grades and classes of Kentucky coals have shown much greater activity lately, but such a wide divergency of prices still exists that specific figures are hard to quote. Lump is ranging from $1.90 to $2.50, with egg less active. Splint coal is short, and Hocking has also been scarce this week

Quotations in the Chicago market are as follows, per net ton, f.o.b. cars mines:

	Wilms. and Frank. Cos.	Springfield	Sullivan County	Clinton	Green and Knox Cos.
Lump	$1.90@2.00	$1.75@1.85	$1.75@1.85	$1.70@1.95	$1.60
Steam lump	1.40@1.50	1.50@1.60	1.35@1.45	1.45@1.60	1.50@1.60
2½ and 3-in. lump	.....	.....	1.50@1.60	1.55@1.65	1.45@1.60
1¼-in. lump	.....	.....	1.35@1.40	1.45@1.50	.....
Egg	1.85@1.90	1.75@1.85	1.40@1.50	1.70@1.80	1.80@1.90
Nut	1.75@1.90	1.75@1.90	1.40@1.45	1.50@1.65	1.60@1.70
No. 1 washed	1.85@2.00	.....	.....	.....	.....
No. 2 washed	1.85@2.00	.....	.....	.....	.....
No. 1 nut	1.90@2.00	.....	.....	.....	.....
No. 2 nut	1.85@1.90	.....	.....	.....	.....
Mine-run	1.25@1.35	1.25@1.35	1.20@1.30	1.35@1.45	1.25@1.35
Screenings	1.05@1.10	1.00@1.10	1.00@1.05	1.05@1.10	1.10

	Saline and Harrisburg	E. Kentucky	Pocah. and W. Va. Smokl.	Penn. Smokeless	Hocking
Lump	$1.75@1.90	$1.80@2.50	$2.00@2.25	$2.00@2.25	$1.75@2.00
1¼-in. lump	1.40@1.50	.....	.....	.....	1.65@1.85
Egg	1.75@1.90	1.50@2.00	2.00@2.25	2.00@2.10	1.75@1.90
Nut	1.75@1.90	1.35@1.45	1.75@1.90	1.60@1.80	.....
No. 1 nut	1.75@1.90	.....	.....	.....	.....
No. 2 nut	1.75@1.90	.....	.....	.....	.....
Mine-run	1.25@1.35	1.35@1.45	1.60@1.75	1.60@1.75	1.35@1.50
Screenings	1.00@1.10	1.10@1.25	.....	.....	.....

W. Va. splint, $1.85@2.10.

Official Contracts

New York, N. Y.—The Central Purchase Committee will receive bids until noon, Sept. 19, for furnishing and delivering unspecified tonnages of buckwheat Nos. 1 and 2, and mixed coal for the Department of Docks and Ferries. Blank forms and other information may be had on application. Address Acting Auditor, F. X. A. Purcell, Central Purchase Committee, 12th floor, Municipal Building, New York, N. Y.

St. Louis, Mo.—The contract for furnishing the Springfield, Mo., courthouse, county jail and road gangs with coal during the ensuing year, has been awarded to the E. L. Viles Fuel Co., at $3.95, delivered to the courthouse and jail, and $3.40 delivered to the road gangs. The contract calls for the best grade, deep-shaft Kansas coal.

Columbus, Ohio—The Board of County Commissioners will receive bids until Sept. 21 for furnishing coal as follows: Courthouse, 1,000 tons; infirmary, 3,000 tons; memorial building, 200 tons.

Salt Lake City, Utah—Bids were received until noon, Sept. 11, for furnishing the Board of Education with coal required for heating the school building during the period from Sept. 30 of this year to June 30, 1917. Address Clerk and Purchasing Agent, L. P. Judd, Board of Education, Salt Lake City, Utah.

Hampton Roads, Va.—Bids for 500,000 to 600,000 tons for shipment to the Panama Canal were opened by the Panama R.R. on Sept. 6 as follows:

Bidder	Tonnage	Coal	Price
Crozer-Pocahontas Co.	150,000		$3.40
C. G. Blake Co.	50,000	New River McKell	3.43
Hartwell, Lester & Clitter, Inc.	50,000	Navy Standard Pocahontas-New River (Smokeless Fuel Co.'s)	3.48
Castner, Curran & Bullitt, Inc.	180,000	Pocahontas New River	3.50
Pocahontas Fuel Co.	200,000	Pocahontas 3-4 Sewell Beckley Fire Creek	3.50

Foreign Markets

GREAT BRITAIN

Aug. 30—Prompt coal is now practically unprocurable, the fortunate holders of such small parcels as are available being able to command their own prices. Consequently, new business for immediate shipment is at a standstill. There is also very little doing for forward shipment.

Best Welsh steam	Nominal
Best seconds	Nominal
Seconds	$11.28@11.52
Best dry coals	10.20@10.80
Best Monmouthshires	11.28@11.52
Seconds	10.56@10.80
Best Cardiff smalls	7.20@ 7.80
Cargo smalls	5.40@ 6.00

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—On account of coal scarcity the freight market continues to be exceedingly quiet, the tendency being all downwards.

Gibraltar	$6.24	Port Said	$13.20
Genoa	14.40	Las Palmas	7.20
Naples	14.40	St. Vincent	7.38
Alexandria	13.80	River Plate	7.80